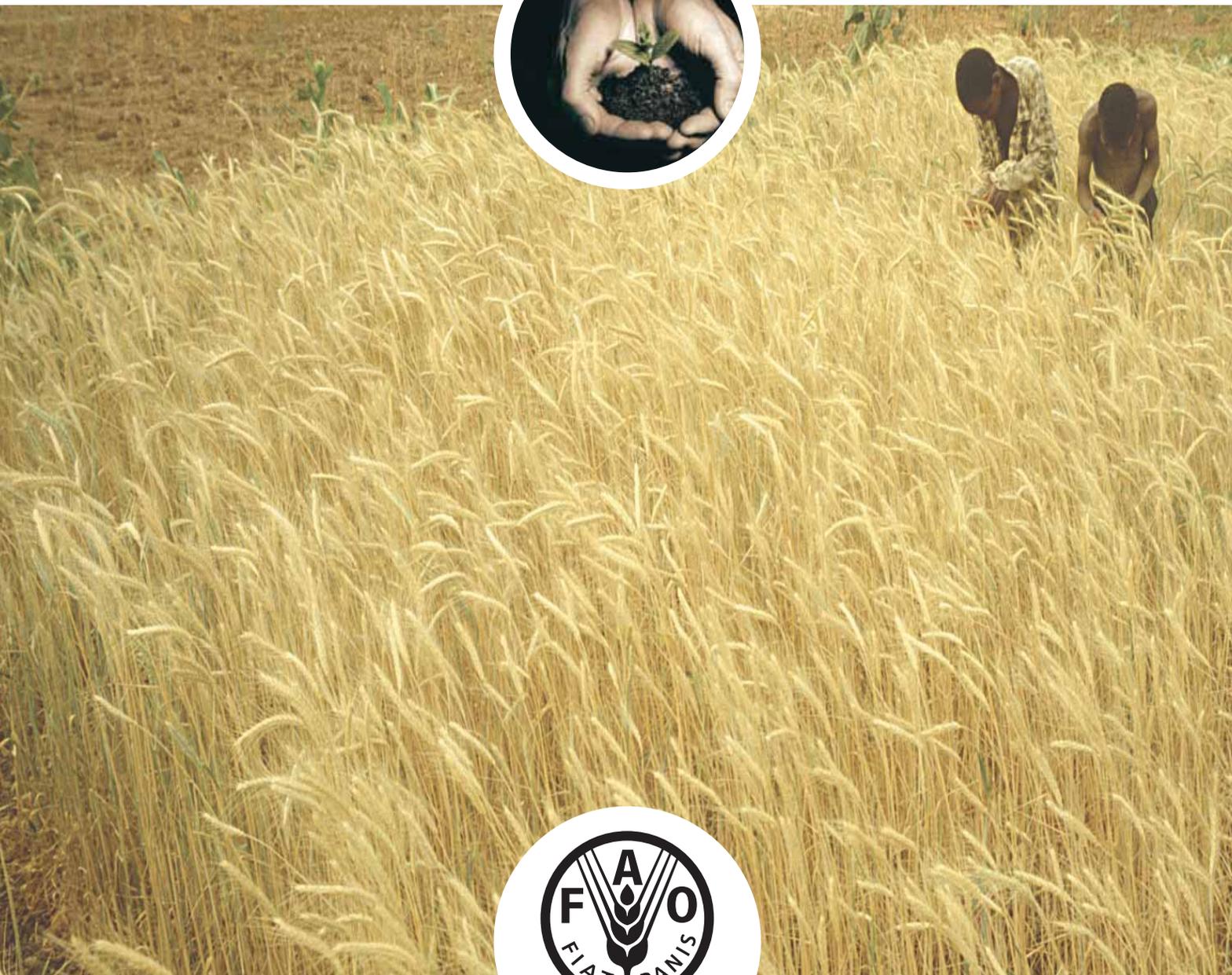




*HIGH FOOD PRICES AND THE FOOD CRISIS - EXPERIENCES AND LESSONS LEARNED **



FAO 2009

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High food prices and the food crisis - experiences and lessons learned

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome
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PART I:
WHAT HAPPENED TO WORLD
FOOD PRICES AND WHY?

WORLD FOOD PRICE INFLATION IN 2007 AND 2008

The upturn in international food prices which began in 2006 escalated into a surge of food price inflation around the world increasing food insecurity, leading to violent protests and even fears for international security. Africa was perhaps hardest hit, but the problem was global. Reports of the impact of high food prices on the poor across many developing countries led to calls for international action to reverse the slide towards increased poverty and malnutrition. Food aid agencies such as the World Food Programme encountered difficulties in meeting the higher costs of purchasing food for distribution and appealed for additional funds.

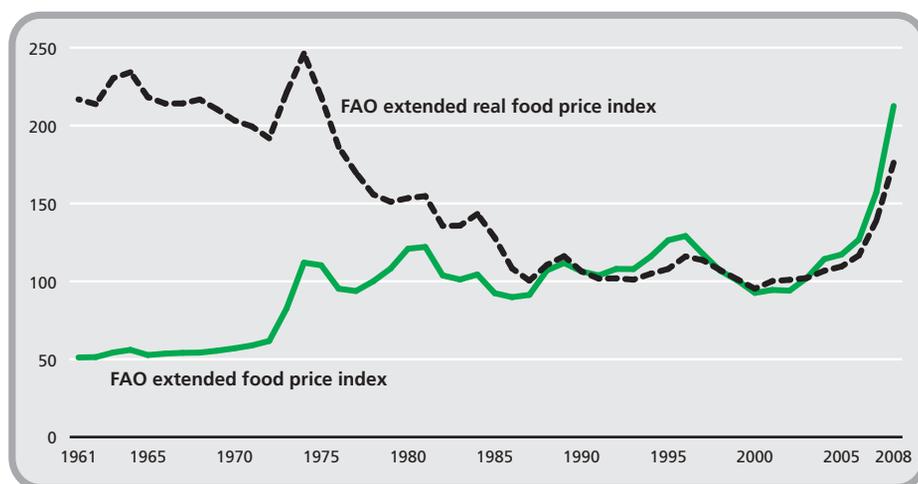
The FAO food price index¹ rose by 7 percent in 2006 and 27 percent in 2007 and that increase persisted and accelerated in the first half of 2008. Since then prices have fallen steadily, but remain above their longer-term trend levels: for 2008, the FAO food price index still averaged 24 percent above 2007 and 57 percent above 2006.

Looking at prices in real terms (deflated by the World Bank's Manufactures Unit Value, *mu*, index), the increases are still significant. Real prices have shown a steady long-run downward trend punctuated by typically short-lived price spikes. There is some suggestion of a flattening out since the late 1980s with a gradual recovery beginning in 2000 before the sharp increase in 2006: the average growth rate over the 2000-2005 period of 1.3 percent per year jumped to 15 percent since 2006.

WHAT DIFFERENCE DO EXCHANGE RATES MAKE?

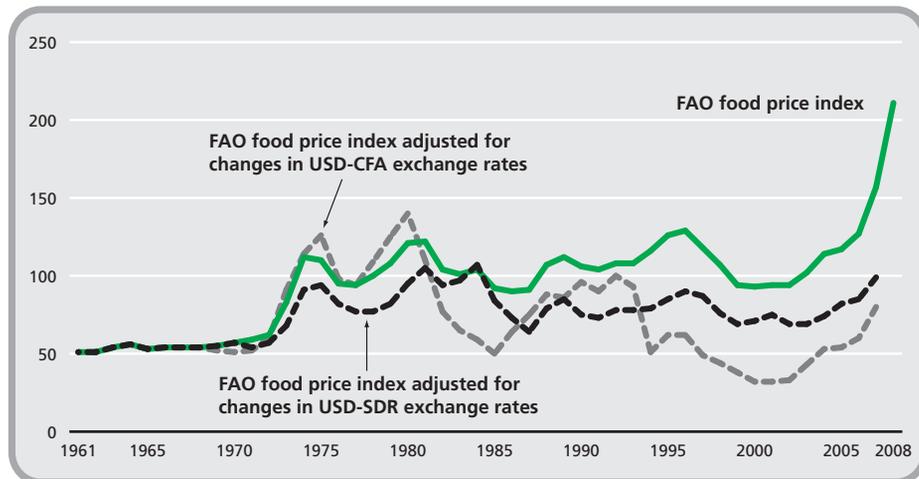
A proportion of these price increases can be attributed to the depreciation of the US dollar in which international prices tend to be denominated. Expressed in other currencies, the increases are less dramatic and within the range of historical variation, but they are still substantial.

Evolution of FAO food price indices, 1998-2000=100



¹ The FAO food price index is a trade weighted Laspeyres index of international quotations expressed in US dollar prices for 55 food commodities (see <http://www.fao.org/worldfoodsituation/FoodPricesIndex>).

FAO food price index (1998-2000=100) adjusted for changes in exchange rates



Source: FAO and IMF

Note: the SDR is a basket of major currencies (euro, sterling, yen and the US dollar) defined by the IMF; the CFA is the currency used in twelve African economies and whose value is tied to the euro.

The relationship between the currency and commodity prices is a complicating factor in assessing agricultural commodity price increases. It also has implications for how different countries are impacted by the changes. The extent to which international price increases translated to domestic consumer and producer price increases in different countries depends upon their dollar exchange rate as well as a variety of other factors such as import tariffs, infrastructure and market structures which determine the degree of price transmission. Because most commodity prices are commonly expressed in dollars, depreciation in the value of the dollar reduces the cost of commodities for countries whose currencies are stronger than the dollar resulting in cushioning of food price increases to a greater or lesser extent. However, for countries whose local currencies are pegged to the dollar or are weaker than the dollar, depreciation in the dollar increases the cost of procuring food. More than thirty developing countries peg their currency to the dollar.

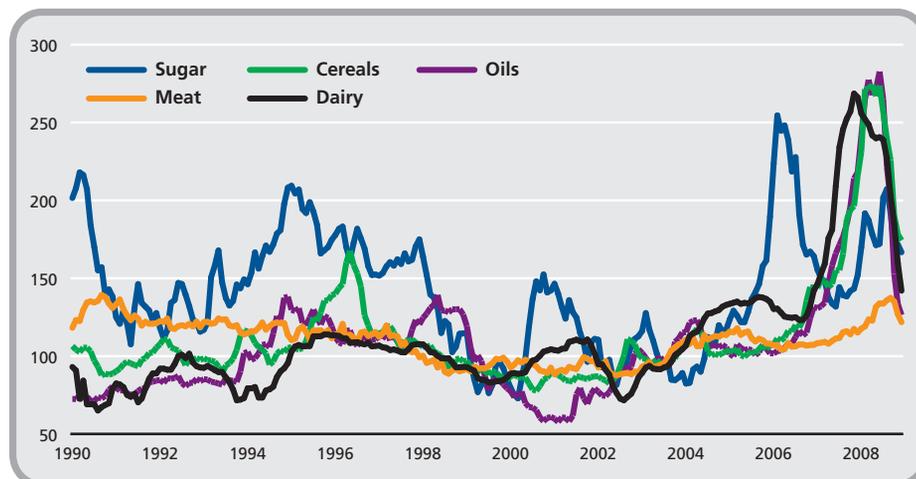
DID THE PRICES OF ALL AGRICULTURAL COMMODITIES INCREASE IN THE SAME WAY?

While almost all agricultural product prices increased at least in nominal terms, the rate of increase varied significantly from one commodity to another. In particular, international prices of basic foods such as cereals, oilseeds or dairy products increased far more dramatically than the prices of tropical products such as coffee or cocoa and raw materials such as cotton or rubber. Developing countries dependent on exports of these products therefore found that while their export earnings may have been increasing this was at a slower rate than the cost of their food imports. Since many developing countries are net food importers this imposes a serious balance of payments problem.

WHAT IS DIFFERENT ABOUT THE 2007-08 FOOD PRICE INCREASES?

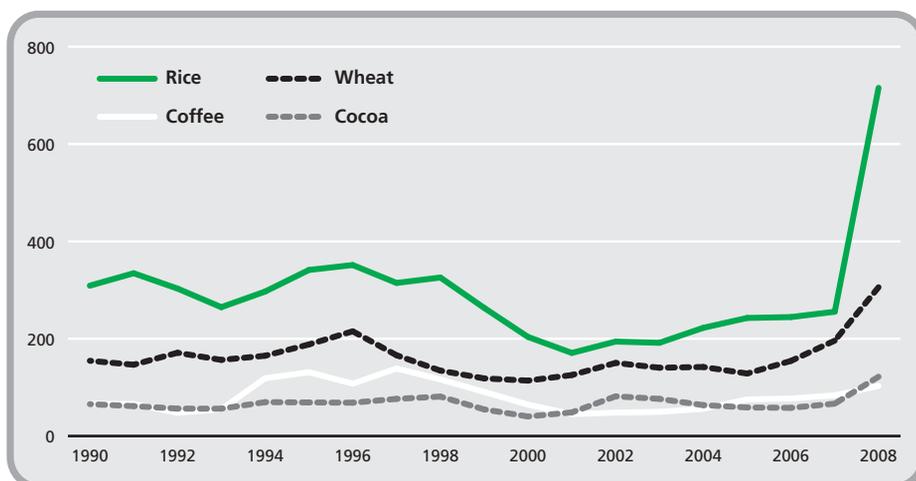
The leap in food prices was in sharp contrast to the secular downward trend and the prolonged slump in commodity prices from 1995 to 2002 which even prompted calls for the revival of international commodity agreements. For some analysts, the increases signalled the end of the long-term decline in real agricultural commodity prices with the Economist

Evolution of monthly FAO price indices for basic food commodity groups, 2002-2004=100



announcing “the end of cheap food”². Others saw the beginnings of a potential world food crisis. It is an interesting question whether these sharp increases are fundamentally different from earlier price spikes and whether the long-term decline in real prices could have come to halt, signalling a fundamental change in agricultural commodity market behaviour. High price events, like low price events, are not rare occurrences in agricultural markets, although often high prices tend to be short lived compared with low prices, which persist for longer periods. What distinguishes this episode is the concurrence of the hike in world prices of not just a few but of nearly all major food and feed commodities and the possibility that the prices may remain high after the effects of short-term shocks dissipate.

Evolution of prices for tropical export crops



Note: wheat and rice prices are in USD per tonne; cocoa and coffee prices are in US cents per pound.

² The Economist 6 December 2007.

The price boom was also accompanied by much higher price volatility³ than in the past, especially in the cereals and oilseeds sectors, highlighting the greater uncertainty in the markets. In the first 4 months of 2008, volatility in wheat and rice prices approached record highs: volatility in wheat prices was twice the level of the previous year while rice price volatility was five times higher. The increase in volatility was not confined to cereals – vegetable oils, livestock products and sugar all witnessed much larger price swings than in the recent past. High volatility means uncertainty which complicates decision-making for buyers and sellers. Greater uncertainty limits opportunities for producers to access credit markets and tends to result in the adoption of low risk production technologies at the expense of innovation and entrepreneurship. In addition, the wider and more unpredictable price changes of a commodity are, the greater is the possibility of realising large gains by speculating on future price movements of that commodity. So volatility can attract significant speculative activity, which in turn can initiate a vicious cycle of destabilising cash prices. At national level, many developing countries are still highly dependent on primary commodities, either in their exports or imports. While sharp price spikes can be a temporary boon to an exporter's economy, they can also heighten the cost of importing foodstuffs and agricultural inputs. At the same time, large fluctuations in prices can have a destabilising effect on real exchange rates of countries, putting a severe strain on their economy and hampering their efforts to reduce poverty.

HOW DOES THE 2007-2008 HIGH PRICE EPISODE COMPARE WITH PAST CRISES?

A look at past price behaviour can indicate how different the recent high food price episode was. One price peak in particular stands out, as can be seen from the graphs, the so-called world food crisis of the 1970s. There are some similarities with that situation: weather and crude oil price shocks resulting in contractions of food production in the wake of rising food demand brought about by rapid population growth in developing countries. Even export restrictions featured, in the same vein as today, as measures to contain domestic inflation. However, one big difference is that while the 1970s crisis was due to supply-side shocks, demand factors, notably biofuel demand, were key to the 2007-2008 episode and may have longer-lasting effects.

At the peak of the 1970s crisis, international quotations of rice and wheat rose to USD 542 and USD180 per tonne, respectively. It would be tempting to conclude that, since prices in early 2008 far exceeded those witnessed in the 1970s, the world was facing a similar crisis. However, the purchasing power of one US dollar today is of course fundamentally different from what it was in the 1970s. Looking at prices in real terms, a drastically different picture is revealed. At 2000 prices and exchange rates, for instance, the cost of one tonne of rice in 1974 stood well over four times their average over the first four months of 2008.

THE END OF "CHEAP" FOOD?

Soaring food prices came as a shock partly because consumers throughout the world had become accustomed to the notion of so called "cheap food". Up until 2006, the real cost of the global food basket had fallen by almost a half over the previous thirty years, with prices of many foodstuffs falling on average by 2 to 3 percent per annum in real terms. Technological advances greatly cheapened the cost of producing foodstuffs and this, together with widespread subsidies in OECD countries that rendered more efficient and cheaper production elsewhere unprofitable, entrenched the role of a few countries

³ Volatility measures how much the price of a commodity fluctuated over a given time frame using the standard deviation of prices. Wide price movements over a short period of time constitute 'high volatility'.

The 1970s World Food Crisis

Over the two decades prior to the 1970's crisis, cereal output in developing countries rose by 80 percent. The "green revolution" led to big gains in productivity and harvested land areas expanded. But, in 1972, bad weather hit crops across the globe and world food production dropped for the first time in 20 years, down 33 million tonnes at a time when the world needed an extra 24 million tonnes to meet the needs of a rapidly rising population. In the following year, a new supply shock played its part in fuelling higher agricultural prices: oil prices quadrupled. This posed a real threat to the green revolution whose success was heavily dependent on pesticides, herbicides and nitrogen-based fertilizer applications, all of which are derived from petroleum. After paying for their oil import bills, many developing countries had little left to buy the chemicals and nutrients that their high-yield, intensive farming required. In 1974, the world anxiously awaited much needed abundant harvests in richer nations in order to replenish stocks and diffuse the growing price crisis. But instead, the United States, Canada, the former Soviet Union and much of Asia gathered poor crops in that year as a result of bad weather. At the end of the year, world cereal reserves had reached a 22-year low, equal to about 26 days supply, compared with a 95-day supply in 1961. To make matters worse, the United States government banned the exportation of 10 million tonnes of grain (mostly to the former Soviet Union) fearing that such a massive sale would compound domestic food price inflation. After peaking in 1974, prices of most foodstuffs remained consistently high up until the early 1980s. Official estimates of the number of deaths as a direct result of the 1970s world food crisis have not been made, but using deviations from trend mortality rates during the crisis period, unofficial estimates put the figure somewhere around 5 million persons. (www.theoil Drum.com).

Source: FAO and *Time*, 11 November 1974

in supplying the world with food. This supply-driven agricultural paradigm sent real prices spiralling downward on a trend lasting for decades. Added to this, changes in the market and policy setting have been instrumental in reducing stock levels and have led to far more planned dependence on imports to meet food needs. Put together, these developments have resulted in a significant role for major exporting countries to supply international markets as needed. It is not surprising therefore that when production shortages occur in such countries, particularly in consecutive years, global supplies are stretched and the ensuing market tightness is manifest in both higher prices and higher volatility. This was precisely the case in the run up to the recent price surge. Against this backdrop, the world's growing demand for agricultural commodities, driven by rising global incomes and population and then expansion in biofuel production, left major exporters with little opportunity to replenish stocks.

Extreme price volatility for several commodities was another factor prompting fears of a wide-scale crisis. In a period of rising and protracted price volatility, it is quite difficult to distinguish between market instability and fundamentally higher price levels. Again, uncertainty as to just what was happening on international food markets added to fears of an impending crisis.

Does the recent high price episode reflect a reversal in the trend of falling real prices or is it the case that the world was experiencing yet another spike, albeit a rather large one? Periods of excessive market turbulence do not necessarily result in a fundamental, permanent shift in the trajectory of prices. When they do so, economists describe the event

as a 'structural break'. Econometric techniques can be used to detect these structural breaks in agricultural commodity prices. Applying these techniques, even the price peaks of the 1970s crisis for many foodstuffs did not manifest themselves as structural breaks. After the worst of the crisis passed, prices simply resumed their preceding trend.

It is difficult to draw any firm conclusions regarding the recent price spike from the evidence to date, and so far econometric tests have failed to detect a structural break. So to answer the question as to whether the recent high price episode is consistent with past commodity price behaviour of sharp but short-lived peaks and prolonged slumps or represents a break with past behaviour patterns it is necessary to explore the nature of the apparent causes. Many different factors have been cited as responsible: production shortfalls, low stock levels, oil prices, biofuel demand, growing incomes in emerging economies, depreciation of the dollar and speculation. While it is difficult to determine their individual contributions quantitatively, some of these factors could have a persistent effect on the average level of prices. There are some features of the current situation, notably the historically low stock levels for cereals and strong demand for biofuels, which suggest that in spite of the downward adjustments from the peak of early 2008, the recent high prices may well not be short-lived but could persist for some years.

Agricultural commodity price spikes

A price spike is a pronounced sharp increase in price above the trend value. For practical purposes, a price spike can be identified as an annual percentage change that is more than two standard deviations of the price in the five years preceding the year that the percentage change is calculated from. Using this definition, it is possible to identify the years in which high price events for basic food commodities (using the FAO food price index) occurred during the 1961-2008 period. Checking each year's percentage change against twice the standard deviation calculated as:

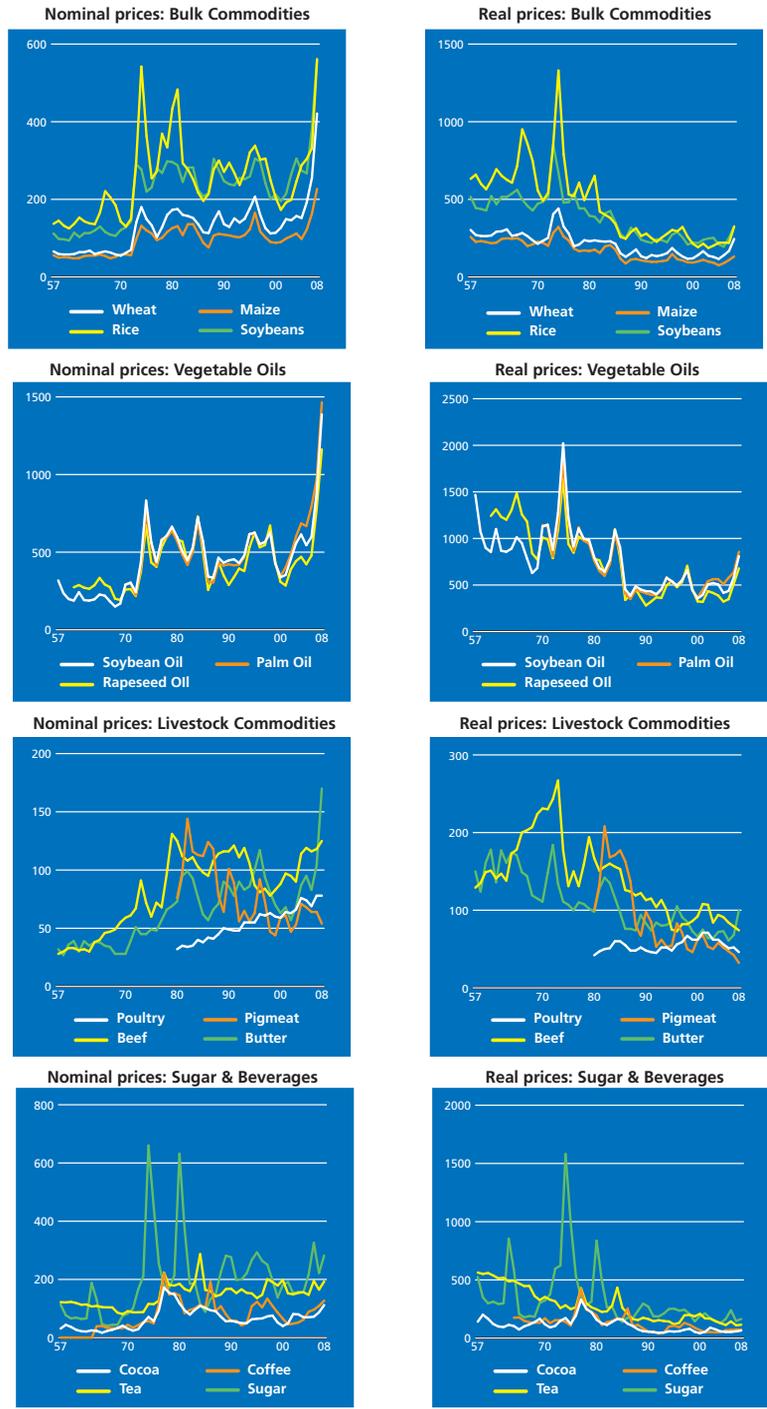
$$\sigma_t = \sqrt{\frac{\sum_{i=t-6}^{t-2} (x_i - \bar{x})^2}{5}}$$

four distinct periods can be identified where prices exhibited significant increases: 1972-74, 1988, 1995, and the current period. The only price events in consecutive years are those that occurred in the first and the last periods: three years in a row in the first (1972, 1973 and 1974) and two years in the last (2007 and 2008). However, when the same methodology is applied to the prices expressed in real terms, only four years appear to have been significant price event years: 1973 and 1974 and 2007 and 2008.

AFTER THE RISE, THE FALL – FOOD PRICES NOW

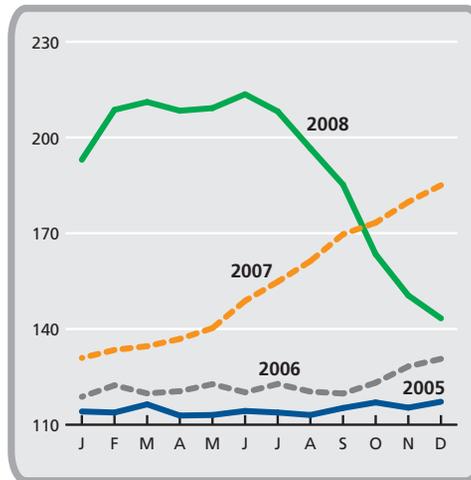
Prices for most agricultural commodities have fallen significantly from the peaks reached in the first half of 2008. World grain prices have fallen by 50 percent and prices for other basic foods have followed. However, prices remain high by historic standards and are still above their 2007 levels. At national level in many countries, but especially in Africa, prices remain substantially above 2007 levels. In some cases the peaks in international prices reached in the first half of 2008 are still working their way through national markets.

Annual food prices, in nominal and real USD terms (1957-2008)

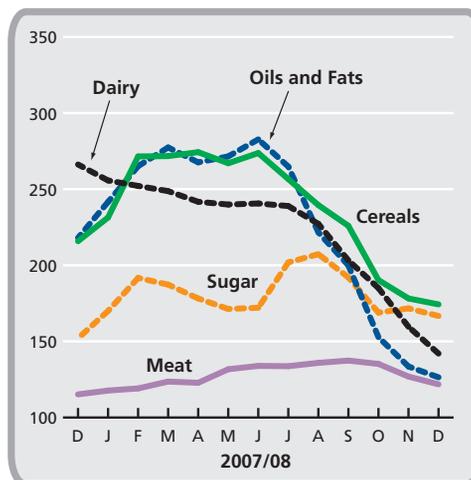


Sources: Cocoa (ICCO); Coffee (ICO); Cotton (COTLOOK, index 'A' 1-3 / 32); Maize (US No.2, Yellow, U.S. Gulf); Rice (White Rice, Thai 100% B second grade, f.o.b. Bangkok); Soybeans (US No.1, Yellow, U.S. Gulf); Sugar (ISA); Tea (Total tea, Mombasa Auction Prices); Wheat (US No.2, Soft Red Winter Wheat, US Gulf); Beef (Argentina, frozen beef cuts, export unit value); Butter (Oceania, indicative export prices, f.o.b.); Pig Meat (USA, pork, frozen product, export unit value); Poultry Meat (USA, Broiler cuts, export unit value); Rape oil (Dutch, fob ex-mill); Soya oil (Dutch, fob ex-mill).

FAO food price indices (2002-2004=100)



Food commodity price indices (2002-2004=100)



WHY DID FOOD PRICES INCREASE SO MUCH?

Different analysts and commentators have emphasised different explanations for the leap in food prices. The most popular is increased demand for certain agricultural products as feedstocks for biofuel production, particularly maize for ethanol. Record oil prices and environmental concerns strengthened interest in alternative energy sources and policy measures in the United States and the EU encouraged the expansion of biofuel production. High oil prices also had a direct impact on the costs of agricultural production and prices. A third popular explanation is rapid economic growth in certain emerging economies, notably India and China, increasing demand for food, especially for livestock products which generated increased cereal and oilseed demands for feed. These explanations focus on 'new' drivers in international agricultural commodity markets, and suggest the possibility of a fundamental change in the behaviour of agricultural commodity prices and continuing high prices. 'Traditional' explanations of high prices are also relevant: supply reductions as a result of drought in major exporters and the lowest cereal stock levels for more than 30 years. A variety of other

complicating factors have also been cited as at least partial explanations of the high food prices. These include an inflow of speculative funds into agricultural commodity futures markets as the global financial downturn weakened more usual bond and equity markets. Once world prices began to rise significantly, the market and policy responses this provoked added to the inflationary pressure: hoarding against expectations of further price rises, or export restrictions, for example.

In practice, all these factors contributed to pushing up food prices. It is the combination of them that was crucial. These were the immediate triggers of increasing food prices but were against the background of the longer-term problems facing developing country agriculture - slowing growth in yields, lack of investment, declining share of agriculture in development aid, declining funds for research and development - which not only exacerbated the food insecurity problem but also made it even more difficult for developing countries to deal with it.

How are agricultural commodity prices determined?

Agricultural commodity prices are determined by a combination of the so-called market fundamentals of demand and supply and exogenous shocks due to factors such as the weather. In spite of intense research, there are still differences of opinion about the nature of price trends and variability and it is not straightforward, except in hindsight, to distinguish between normal variability and a change in trend.

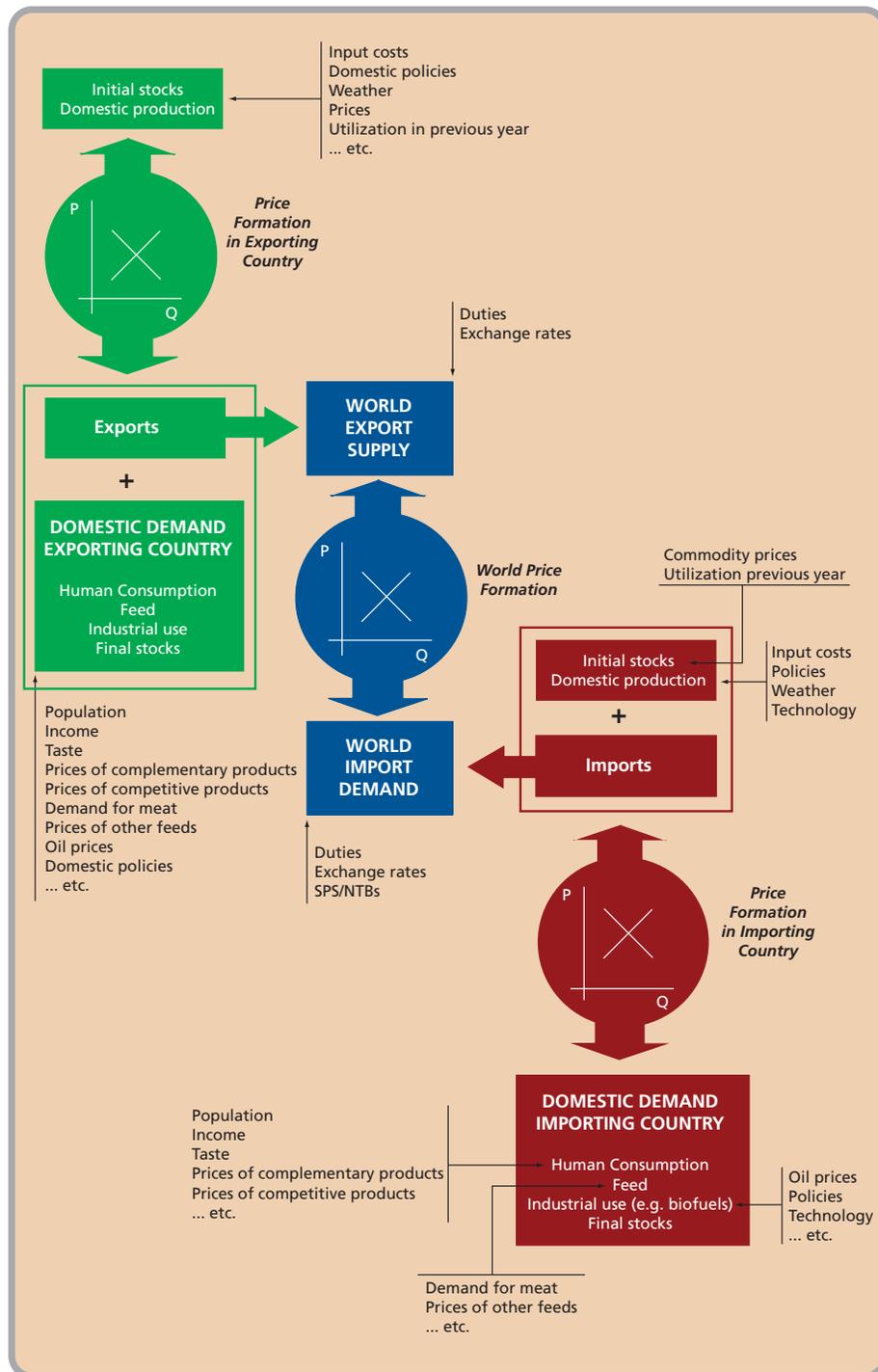
It is important to delineate those factors driving demand and supply which produce the underlying trends in prices and those which cause variability around those trends. Long-run changes in food demand are primarily the result of population and income growth, but are also influenced by relative price changes and the evolution of dietary patterns. Demand for agricultural raw materials such as rubber is related to economic growth more generally. Long-run expansion in supply is primarily driven by technological progress which reduces costs. In the past, technological progress reduced costs and induced supply expansion at a faster rate than population and income growth expanded demand leading to a long-run relative decline in agricultural commodity prices. Recent circumstances may have been different in that demand growth, as a result of income growth in emerging economies and biofuel demands, may run ahead of supply expansion leading to price increases. Supply expansion may be constrained in the short-term by the cost and availability of key inputs and other supply-side problems and in the longer term by the availability of land and water resources, labour and climate change. Volatility in prices stems from supply and demand shocks. In the short-run supply and demand for agricultural products are inelastic and do not respond much to price changes, so supply and demand shocks can produce wide swings in prices. Supply shocks are perhaps most important, because of the dependency of agricultural production on the weather, although demand shocks can be important too, especially for certain raw materials. The impact of shocks in demand and supply on prices can be cushioned by the possibility of running down or adding to stocks. The level of stocks in relation to demand is therefore an important factor in commodity prices. If the “stocks-to-utilization” ratio is low because stocks are low or demand is high or both, there will be upward pressure on prices. Markets and prices for agricultural commodities do not adjust immediately to supply or demand shocks. The effects of shocks tend to be less persistent when they are supply shocks - due to bad weather for example - and more persistent in the case of demand shocks.

Prices of different commodities are linked through possible substitution or complementarity in consumption or production. These lead to cross effects of price changes from one commodity to another: higher prices for maize, for example, will lead producers to grow more maize at the expense of other crops, reducing their supply and raising their prices; or increasing demand for livestock products will lead to increased feed demand and prices for cereals and oilseeds.

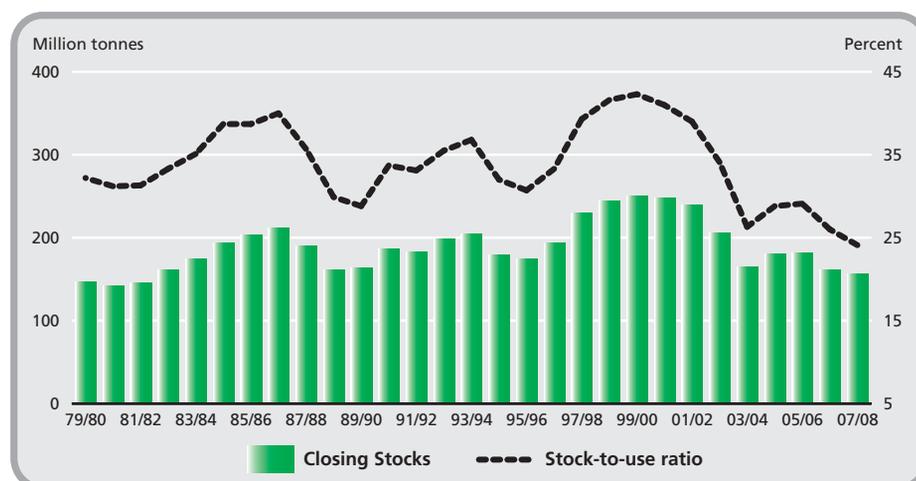
PRODUCTION SHORTFALLS AND LOW STOCKS

Traditional explanations for food price variability emphasise the importance of exogenous shocks to agricultural supply, notably as a result of the weather. A critical initial trigger for the recent price hikes was the decline in the production of cereals in major exporting countries beginning in 2005 and continuing in 2006; cereal production declined by 4 and 7 percent respectively in these two years. However, there was a significant increase in cereal output in 2007, especially in maize in the USA, responding to the higher prices. The quick supply response for cereals in 2007 came at the expense of reducing productive resources allocated to oilseeds, especially soybeans, resulting in a decline in oilseed production.

Factors affecting agricultural commodity prices

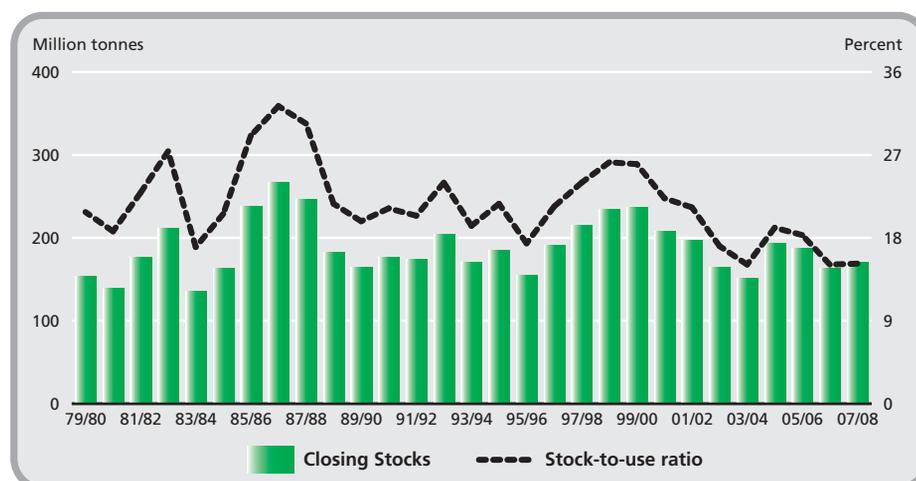


Evolution of wheat ending stocks and stock-to-use ratios



Source: FAO

Evolution of coarse grains ending stocks and stock-to-use ratios



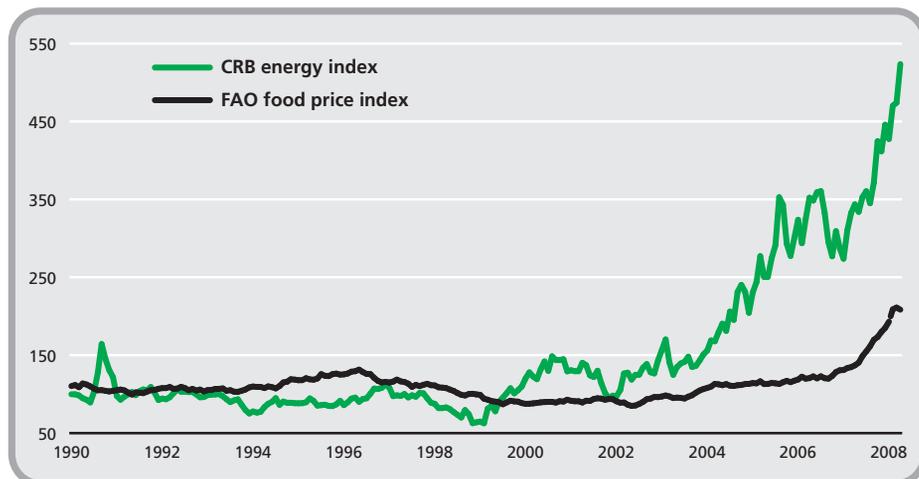
Source: FAO

Stocks play a key role in equilibrating markets and smoothing price variations. If stocks are low relative to utilisation, markets are less able to cope with supply and demand shocks and supply shortfalls or demand increases will lead to bigger price increases. This ratio fell sharply from 2006 onwards, reaching a historic low in 2008.

The level of stocks, mainly of cereals, has been falling since the mid-1990s. Indeed, since the previous high-price event in 1995, global stock levels have on average declined by 3.4 percent per year. There have been a number of changes in the policy environment after the Uruguay Round Agreements that have been instrumental in reducing stock levels in major exporting countries: the size of reserves held by public institutions; the high cost of storing perishable products; the development of other less costly instruments of risk management;

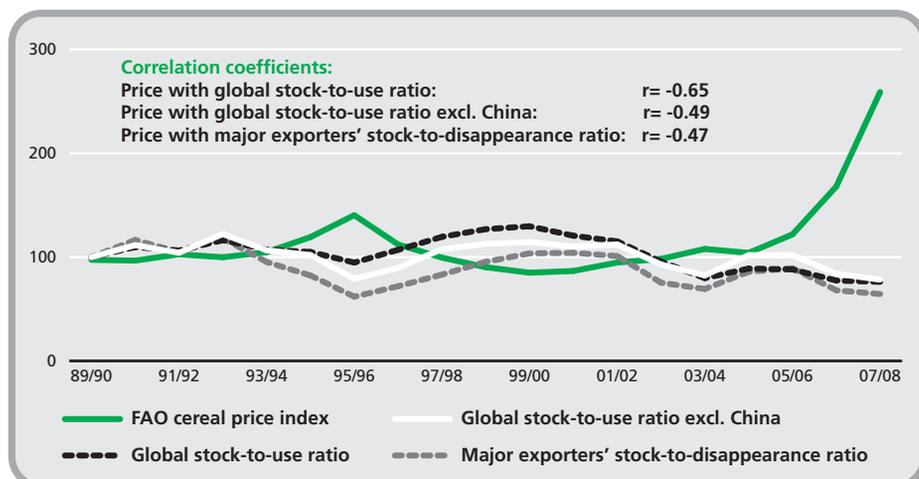
increases in the number of countries able to export; and improvements in information and transportation technologies. When production shortages occur in consecutive years in major exporting countries under such circumstances, international markets tend to become tighter and price volatility and the magnitude of price changes become magnified when unexpected events occur. Indeed, there is a statistically significant negative relationship between marketing season beginning stocks (expressed as a percentage of expected utilisation in the ensuing season) and the cereal prices formed during the same season. This means that tight markets at the global level at the beginning of the marketing season tend to put upward pressure on prices. This was one of the main reasons why international cereal prices spiked so sharply in 2006. Continuing low stock levels is one reason why relatively high prices could be expected to persist for some time. By the close of the seasons ending in 2008, world cereal stocks had increased by only 1.5 percent from their already reduced level at the start of the season and reach their lowest levels in 25 years. The ratio of world cereal stocks-to-utilization

Energy and food price indices (2002-2004=100)



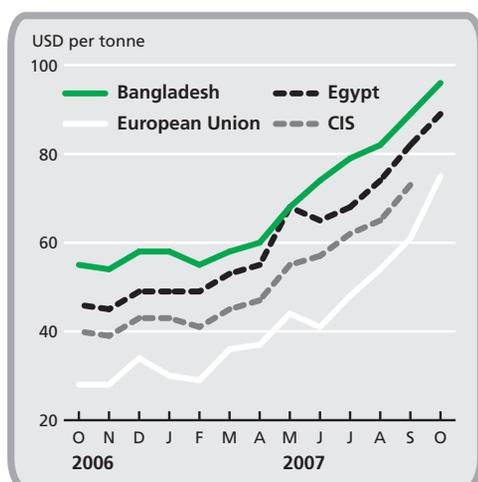
Source: FAO and Reuters-CRB (<http://www.crbrtrader.com/crbindex/>)

Relationship between cereals stock ratios and prices



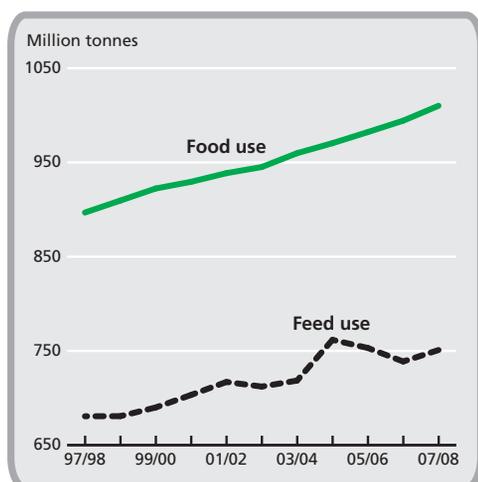
Source: FAO

Ocean freight rates for grains from US Gulf ports to selected countries



Source: International Grains Council

World cereal food and feed utilization



Research Institute (IFPRI) study⁴. This argued that rapid economic growth in certain developing economies has pushed up middle class consumers' purchasing power and this has increased demand for livestock products such as meat and milk and hence demand for feed grains.

Emerging economies, particularly China and India, are certainly playing an important role in global agricultural commodity demand and supply. However, the high commodity prices of 2007 and 2008 do not seem to have originated in these emerging markets.

Cereal imports by China and India have been trending downwards since 1980, by about 4 percent per year, from an average of about 14 million tonnes in the early 1980s to roughly 6 million tonnes during the past three years.

in 2007/08 stood at 19.6 percent, well below the 5-year average of 24 percent and even smaller than the previous low of 20 percent in 2006/07. The stock situation for oils/fats and meals/cakes began to deteriorate in mid-2007 after the spillover effects from developments in the cereals markets, especially of wheat and coarse grains, with the stock-to-utilisation ratio falling from 13 to 11 percent for oils/fats and from 17 to 11 percent for meals/cakes by the end of the 2007/08 season.

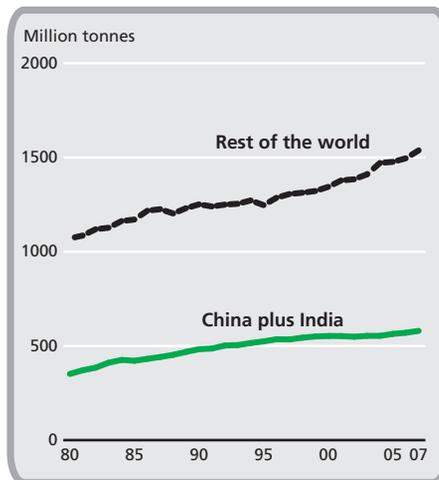
PUTTING FOOD AND FEED IN PERSPECTIVE – CHINA AND INDIA

The increase in world population requires higher food production if consumption requirements are to be met. Increasing incomes generally also lead to changes in diets, often reflected in stronger demand for higher value foods (such as livestock products) as opposed to starchy staples (such as wheat). Because these changes are gradual, it is not correct to consider them as an underlying cause for any sudden price increase such as the one experienced recently. Therefore, this widely accepted notion that rising demand in places like China and India, the two most populous countries with rapid population and income growth, is a reason for soaring food prices, warrants re-examination.

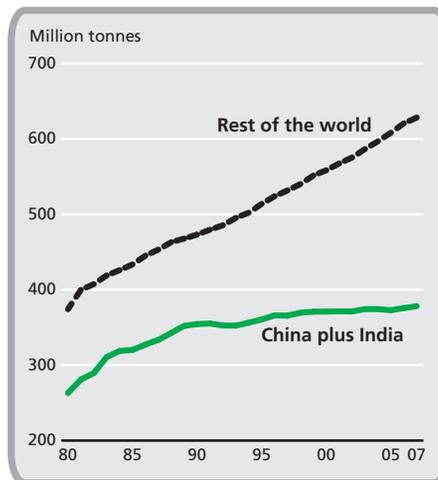
The importance of growth in demand from China and India as a shaper of world food markets and prices was highlighted in a recent International Food Policy

⁴ International Food Policy Research Institute, High and rising food prices, IFPRI, Washington, 2008

Cereal utilization in China and India and the rest of the world

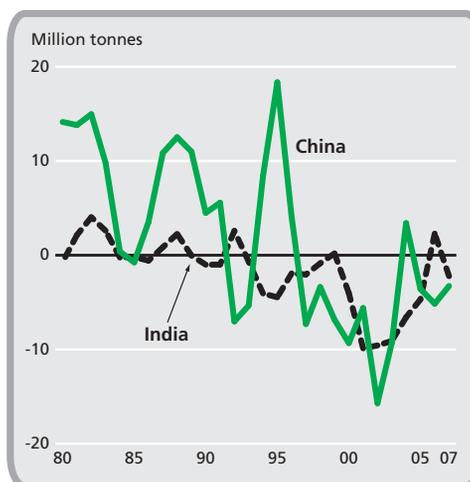


Cereals used for food in China, India and the rest of the world



This means that the growth in cereal feed demand in these two countries, at least up to recently, has been met mainly by domestic sources. Moreover, while China has become a major importer of oilseeds, vegetable oils and livestock products, the country's overall

Net imports of cereals by China and India



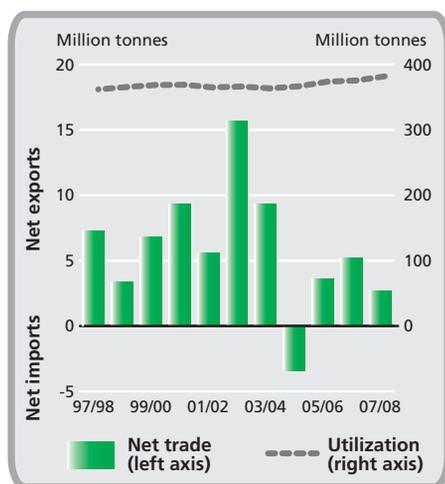
agricultural trade balance remained largely positive in most years since the mid-1990s. The long-term development in the trade position of India also goes contrary to the belief that India is one of the drivers of increasing food prices in world markets. India has been a major exporter of food and in most years, between 1995 and 2007, exported more wheat, rice and meat than it imported. Even India's relatively large imports of vegetable oils need to be considered in the context of equally large exports of oilcakes. In fact, in the case of both China and India, there was no evidence that there has been a sudden increase in the imports of oilseeds, meals and oils to indicate that they have contributed to their price hike, which began in mid-2007 after the spike in the prices of

grains (maize in particular) a year earlier. China and India have not been the cause of the sudden price spike in the oils complex, but this does not downplay their role, nor that of the changing consumption patterns, in general, on developments in food markets, both in the past and in the future.

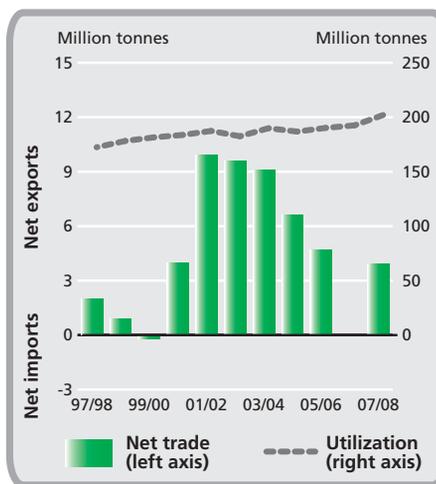
WHAT ABOUT BIOFUELS?

Demand for certain agricultural commodities as feedstocks for biofuels can mean less productive resources used in the production of food crops. Biofuel production may reduce the availability of food commodities on the market because 'effective' demand for grains,

Cereal utilization and net trade in China

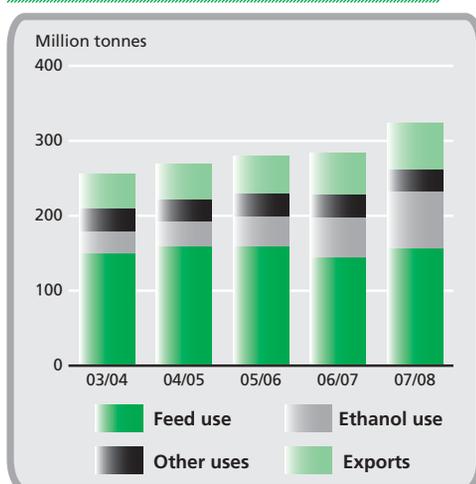


Cereal utilization and net trade in India



sugar or oils and other basic food staples as feedstock for fuel production could outbid that for food where the prices of oil and feedstocks favour biofuel production. This new source of demand has been playing an important role in influencing prices. Among all major food and feed commodities, additional demand for maize (a feedstock for the production of ethanol) and rapeseed (a feedstock for the production of biodiesel) have had the strongest impact on prices. For example, out of nearly 40 million tonnes increase in total world maize utilization in 2007, almost 30 million tonnes were absorbed by ethanol plants alone. Most of this expansion occurred in the United States, the world's largest producer and exporter of maize. In the United States, maize utilized to produce ethanol represented around 30 percent of its total domestic utilization. This contributed to the steep rise in international maize prices observed since the beginning of 2007. The intensity of the price reaction was also related to the fast pace (mostly within 2-3 years) in which this new demand materialized and to its concentration in the United States (more than 90 percent), a major exporter of maize. Globally, some 12 percent of total world maize utilization was used for ethanol in 2007, compared to 60 percent for animal feed. In the EU, the biodiesel sector is estimated to have absorbed about 60 percent of member states' rapeseed oil output in 2007, which amounts to about 25 percent of global production and 70 percent of global trade in the commodity in that year.

Maize utilization and exports in the United States



The issue is not limited to how much of each crop may be used for biofuels rather than for food and feed, but how much of planting area could be diverted from producing other crops to those used as feedstock for the production of biofuels. Already high maize prices since mid-2006 encouraged farmers in the United States to plant more maize in 2007. Maize plantings increased by nearly 18 percent. This increase

was only made possible by the reduction of soybean and wheat areas. The expansion in maize plantings combined with favourable weather resulted in a bumper maize harvest in 2007 enabling the United States to meet both domestic demand, including that from its growing ethanol sector, as well as exports. However, this apparent success in maize disguised another important development: reduced wheat and soybean plantings, and therefore their production. This was one reason for their sharp price increases. Of course, had production in Australia not suffered from another year of drought and outputs in the European Union and Ukraine also were not hampered by the unfavourable weather, it is conceivable to assume that grain prices would not have increased by as much as they did.

This chain reaction somewhat re-peated itself in 2008 but this time in reverse order. Farmers in the United States cut back on their maize plantings in favour of soybeans because of their higher relative prices. Strong soybean prices gave rise to a substantial increase in soybean planted area in the United States for the 2008/09 marketing season. This trend is confirmed by the soybean/maize price ratio in the futures market. From a historical perspective, whenever the ratio approaches two, as a rule of thumb soybeans are favoured over maize, resulting in a shift of planting area from soybeans to maize. As this ratio fell in 2006/07 farmers drastically increased maize plantings. However, with the ratio well over two in the 2007/08 season, farmers expanded soybean plantings instead. Increases in soybean plantings were a positive development for the soybean market but left the maize market precariously balanced. In view of the new US Energy Bill, the demand for maize by the ethanol sector is expected to continue to rise. If production of maize were to decline in 2009, it would be difficult to picture how the United States could meet all demand (food, feed, fuel and export) without a significant drawdown on its own maize stocks during the 2009/10 season. The market will be closely watched for indications of this eventuality. In these periods of market tightness, maize prices could firm, with a strong possibility of spill over to other major food and feed crops.

With the exception of ethanol production from sugar cane in Brazil, production of biofuels is currently not economically viable without subsidies or other forms of policy support. The production costs per litre of biofuel are by far the lowest for Brazilian sugar cane ethanol which is the only biofuel that is consistently priced below its fossil-fuel equivalent. Brazilian biodiesel from soybean and United States ethanol from maize have the next lowest net production costs, but in both cases costs exceed the market price of fossil fuels. European biodiesel production costs are more than double those for Brazilian ethanol, reflecting higher feedstock and processing costs. According to the Global Subsidies Initiative, the United States spent USD 5.8 billion on biofuel subsidies in 2006 while the EU spent USD 4.7 billion. These policy interventions encouraged the rush to liquid biofuels and hence increased demand for certain agricultural products as feedstocks. One motivation for such support - the claimed environmental benefits of biofuels over fossil fuels - is now being questioned as evidence emerges that reductions in greenhouse gas emissions are less than originally assumed for certain types of biofuels. However, while support for biofuels remains in place, the additional demand for the agricultural products involved will continue to shore up their prices with spill-over effects on prices in other agricultural markets.

Much depends on oil prices. The higher oil prices are, the more economically viable biofuel production becomes and the more agricultural products are demanded as feedstocks. When oil prices reach a level where biofuels become competitive, demand by the energy market for agricultural products as feedstocks increases and this new demand pushes up agricultural prices. Agricultural and energy markets therefore become linked in a new way. As energy markets are huge relative to agricultural markets, demand from the biofuel sector could *in principle* absorb any additional production of crops useable as feedstocks

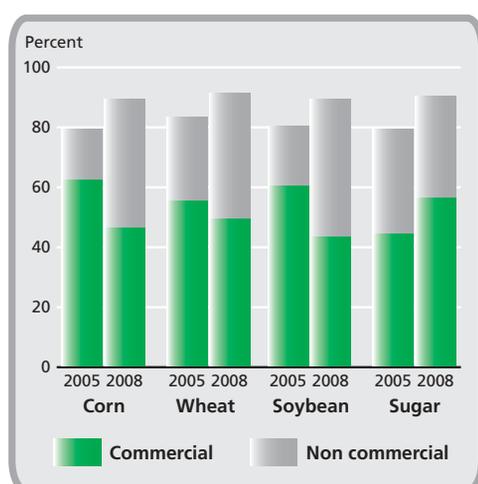
so the energy market would effectively set a floor price for the agricultural products. It would also set a ceiling on agricultural product prices at the point where they have risen so much that biofuel production is no longer competitive. It would be energy demands rather than food demands which would set agricultural product prices and agricultural product prices would be tied to energy prices. Clearly this would be a major departure from how agricultural product prices have been determined in the past.

WHAT IS THE ROLE OF SPECULATION?

Recent discussions of high food prices included a growing interest in the possible effects of speculators and institutional investors – “non-commercial traders” - buying into agricultural commodities on futures markets as returns on other assets became less attractive. There has been some concern that speculation has contributed to increasing food prices. The downturn in the global properties and securities markets resulted in an inflow of funds into agricultural commodity futures markets looking for profits, both from traditional institutions like hedge funds and pension funds and from newer commodity-linked and exchange-traded funds. Global trading activity in futures and options combined has more than doubled in the last five years. In the first nine months of 2007, this activity grew 30 percent over the previous year. Notably, the share of non-commercial traders taking long positions in the commodity markets has been going up, indicating increased interest on their part in buying futures contracts. Between 2005 and 2008, non-commercial traders almost doubled their share of open interests in the maize, wheat and soybean futures markets although their share in the sugar futures market remained largely unchanged. Investments by institutional investors can be large, although the volume of these investments in agricultural commodities has not been as significant as in other commodities such as metals.

The increase in the shares of non-commercial traders in corn, wheat and soybean markets coincided with the increase in prices of these commodities in the physical markets. This high level of speculative activity in agricultural commodity markets in the last few years has led some analysts to connect the increases in food prices with increased speculation. However, it is not clear whether speculation on agricultural commodities was driving prices higher or was attracted by prices which were increasing anyway. A recent study by the IMF concluded that in general it was the high prices which were encouraging inflows of

Share of commercial and non-commercial traders in futures markets



Source: OECD

investment funds into futures markets for agricultural commodities. This question of causality requires further research. Large inflows of funds could provide a further explanation at least for the persistence of high food prices and their apparently increased volatility. Again, further research is needed. In the meantime, the role, if any, of financial investors in influencing food prices is a matter of concern to the extent that some countries have even considered additional regulation.

NO SINGLE EXPLANATION FOR SOARING FOOD PRICES

The sharp jump in the US dollar prices of food which peaked in the first half of 2008 can be characterized as the most

significant spike since the 1970s. The reason for this development was supply and demand imbalances in many of the major commodity markets, notably cereals and oilseeds. It is primarily on the demand side that plausible explanations for the food price hike can be found. The principal drivers of increasing prices on the supply side tend to be short-lived and are related to production shortfalls and to policy measures such as restrictive export policies by major traders. On the demand side, factors contributing to the recent rise in world food prices are few. Unlike with supply, in general changes on the demand side are not rapid nor are they unexpected. This is because aside from the emerging biofuel factor, the main drivers of demand in food markets are population and income growth. In most cases, these two fundamental variables manifest a gradual (and expected) upward demand progression and in this way allow for supply to adjust. The situation during the recent high price period does not depart from this trend in that neither food nor feed demand exhibited any sudden or unexpected increase that would have merited the kind of price rises witnessed by markets. Speculation and inflows of investment funds are more likely to have followed the increasing prices than to have caused them. Only the rapid expansion of demand for biofuel feedstocks marks a major departure from past experience. However, biofuel demand alone cannot explain the extent of the price increases through 2007 and early 2008. Record oil prices have increased interest in biofuel development but have also

Speculation on agricultural commodity markets

Typically commodity exchange markets provide risk management tools such as futures and options to enable market participants like farmers, processors, producers or traders – “commercial traders”- to hedge against the risk of price fluctuation in the future. These markets also assist in the discovery of prices and thus provide a measure of predictability in ascertaining future prices. Another market activity is speculation, undertaken, mainly by speculators or investors – “non-commercial traders”. This involves making profits by speculating on future movements in the price of an asset or a commodity.

Speculation is important for the efficient functioning of markets since it brings liquidity into the market and helps farmers and other participants to offset their exposure to future price fluctuations in the physical commodity markets. However, speculation can sometimes play a perverse role in markets. For instance, excessive levels of speculation can lead to sudden or unreasonable fluctuations or unwarranted changes (in one particular direction) in commodity prices. This may occur when an increasing share of open interests (number of outstanding futures contracts) is held by investors interested in gaining from future price movements with little regard to the fundamentals of commodity demand and supply. The impact of excessive speculation is thus counterproductive to futures markets because the risk of price volatility is a fundamental condition which these markets attempt to address. In addition, excessive speculation in agricultural commodity markets may transmit inappropriate market signals to agricultural producers leading to inefficient allocation of resources.

The level of speculative activity could be controlled by regulating commodity markets. One way is through limiting the number of futures contracts one participant, other than a participant eligible for hedge exemption, can hold thereby limiting the ability of a single participant to influence the market. However, this is risky as excessive regulation may drive speculators out of the market, depriving it of liquidity.

had a major impact in their own right driving up production and transport costs. Upward pressure on prices has been reinforced also from the demand side by fears that prices might go even higher and increased demand for stocks. The sharp increase in food prices on world markets cannot be attributed to any one single factor. Each one of those causes commonly cited cannot of itself explain the pattern and extent of recent price movements. It is their coincidence and combination that accounts for the dramatic changes. Disentangling their separate effects is problematic, although the evidence does point to biofuel demand and oil prices as the principal drivers.

Some broad indication of the relative impacts on food prices of the various factors can be gleaned from simulations with the OECD-FAO Aglink-Cosimo model of world agricultural market. This model is used to generate market projections over the medium term on the basis of assumptions concerning the future values of key variables affecting markets and prices⁵. Varying these assumptions and comparing the resulting projections gives an indication of the strength of each influence. The five key assumptions examined were: 1) biofuel use of grains and oilseeds; 2) petroleum prices; 3) income growth in major developing economies: China, India, Brazil, Indonesia and South Africa (EE5); 4) the exchange rate of the USD relative to the currencies of all other countries, and 5) crop yields.

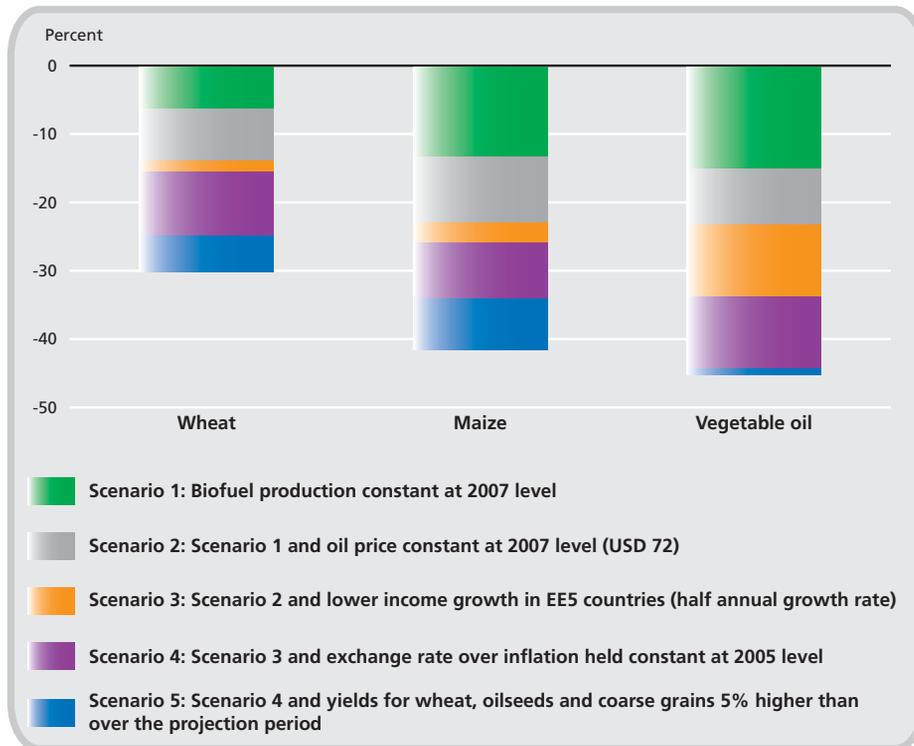
For coarse grains and vegetable oil, the price outlook would be most affected if biofuels production were to remain constant at 2007 levels. Changes in demand for these commodities as feedstocks for biofuel production are a source of uncertainty, no matter whether the cause is an oil price change, a change in biofuel support policies or a new technological development that lead processors to buy different feedstocks. Holding biofuels production constant at its 2007 level results in a 12 percent decline in the 2017 projected prices for coarse grains and around 15 percent in the projected price of vegetable oil. The second scenario shows that wheat, coarse grains and vegetable oil price projections are all highly sensitive to petroleum-price assumptions and would be a further 8-10 percent lower if oil prices fell to their 2007 level. The reduced GDP growth scenario produces wheat and coarse grains prices that are only modestly (1 to 2 percent) below the baseline. For vegetable oils, reflecting presumably a much higher income elasticity of the demand and a greater influence of the five countries in world trade, the simulated price difference is over 10 percent. A fourth scenario simulating a stronger US dollar raises prices in domestic currency terms in exporting countries, providing greater incentives to increase supplies. At the same time, a stronger US dollar reduces the import demand in importing countries. The combination of greater export supply and weaker import demand puts additional downward pressure on world prices. By 2017, wheat, coarse grain and vegetable oil prices would all be some 5 percent below the corresponding baseline projection. The scenario under which cereals and oilseeds yields are assumed to be 5 percent higher leads to projected wheat and maize prices for 2017 that are 6 percent and 8 percent lower respectively than the corresponding baseline value, but make little difference for projected vegetable oil prices.

WHY HAVE PRICES FALLEN?

The sharp fall in international food prices since July 2008 reversed their equally sharp rise up to that point and pushed them back towards their 2007 levels. The underlying causes of

⁵ Aglink-Cosimo is a partial equilibrium model, a joint project of FAO and the Organization for Economic Co-operation and Development (OECD). These scenarios are described in more detail in the OECD-FAO Agricultural Outlook 2008-2017. Aglink-Cosimo provides a comprehensive dynamic economic and policy specific representation of 58 of the world's major producing and trading countries and regions for the main temperate-zone commodities as well as rice, sugar and palm oil. Ethanol and biodiesel are also now included. As most models of this type, the model is driven by elasticities, technical parameters and policy variables.

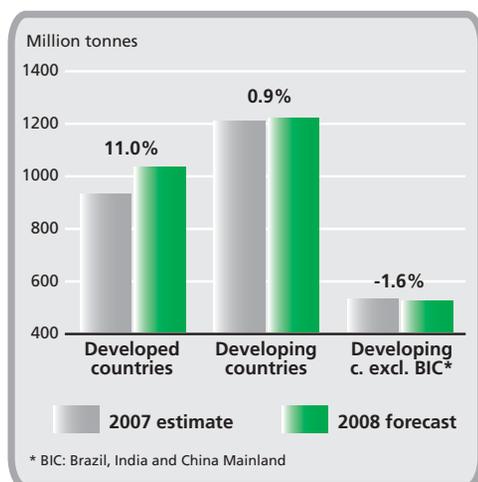
Sensitivity of projected world prices to changes in five key assumptions, percentage difference from baseline values, 2017



the reversal are a mixture of supply and demand factors. High prices have encouraged an expansion in global production of cereals, although this supply response was concentrated mostly in the developed countries and, among developing countries, Brazil, China and India. With the exception of these three, cereal production actually fell between 2007 and 2008 in developing countries. It is clear therefore that high food prices were not an opportunity seized by the majority of poor farmers in developing countries: their supply response was limited in 2007 and has been virtually zero in 2008. Falling food prices have little to do with increasing global supplies. The explanation is more in terms of slowing demand as the financial crisis and emerging global recession reduced economic activity and oil prices tumbled. The declining demand is impacting most, at least initially, on the markets and prices of agricultural raw materials such as rubber, but food prices are also being affected.

Falling food prices are obviously good news for consumers but they should not be taken to imply that the global food system's problems are solved. Most of the critical factors which underlay the high price episode and the resulting threat to food security remain. Developing country food production has not seen any significant increase and weaker price incentives will not encourage further expansion of production elsewhere. Global cereal stocks are still low with the cereals stocks-to-use ratio in 2008/09 below their 5-year average. Although oil prices have fallen drastically, biofuel demand remains strong as feedstock prices have fallen and new ethanol production capacity comes on line. The impact of falling oil prices on agricultural prices is complicated. Lower oil prices reduce energy and fertilizer costs but will compound the downward pressure on prices of those commodities usable as feedstocks as biofuel becomes less competitive. The net effect will depend upon the relative price

Cereal production in 2007 and 2008

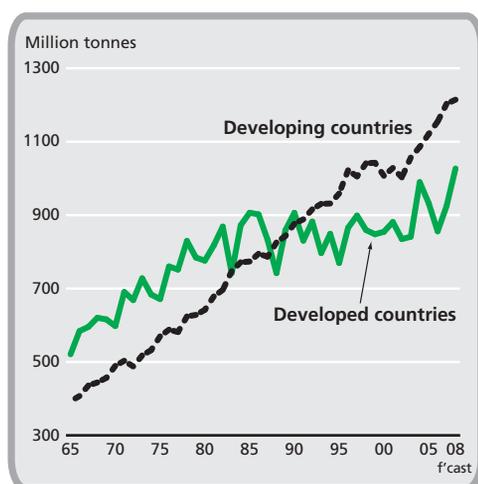


movements between oil and feedstocks, notably maize.

WHAT ABOUT THE MEDIUM-TERM?

The fall in food prices on international markets has been sharp but prices remain substantially above their average of the last five years. The big question is whether prices will fall further or remain at these historically high levels. Prices have fallen in the second half of 2008 as dramatically as they increased in the first half. In either case, some overshooting is likely reflecting the much increased volatility, so it is difficult to distinguish an adjustment to a new trend. However, some of the factors cited as explanations for high prices suggest that they will persist, against the pattern of past commodity price behaviours where price spikes have been short-lived and followed by prolonged slumps. More generally, as noted above, with the significant exception of oil prices, the factors which contributed to high food prices remain unchanged. Supplies have not increased substantially and stocks remain low.

Cereal production in developing and developed countries



The *OECD-FAO Agriculture Outlook 2008-2017* indicated that both nominal and real agriculture commodity prices would fall from the record levels reached in early 2008, but would remain higher over the next decade compared to the previous one. That decline has already

begun, but more rapidly than expected as a result of the financial crisis and the downturn in the world economy. How long that decline will continue will depend upon the speed of recovery from the recession. However the *Outlook* argued that among the prime factors in the latest price spike – droughts in key grain-producing regions; increased biofuel feedstock demand; high oil prices; US dollar depreciation; and a changing demand structure for commodities all in the context of low stocks – some have permanent elements that are expected to sustain higher prices over the next ten years. In particular, the *Outlook* pointed to biofuel demand and oil prices. While globally, and in absolute terms, food and feed remain the largest sources of demand growth in agriculture there is now a fast growing demand for feedstock by the bioenergy sector. Biofuel demand is the largest source of new demand in decades and is seen as a strong factor underpinning the upward shift in agricultural commodity prices. Biofuels have forged a new link between agricultural product prices and oil prices which also has the potential to break the pattern of long-run decline in real agricultural commodity prices at least in the medium-term.

The financial Crisis, recession and agricultural commodity prices

Growth of the world economy is expected to be only 2 percent in 2009 compared to 3.8 percent in 2008. Evidence of global recession has accumulated with projected growth in major developed economies reduced to zero or even negative. The financial crisis and more significantly the global recession has obviously contributed to the dramatic fall in agricultural commodity prices. However, it is difficult to separate the impacts of the crisis and recession from the expected market adjustments to apparent overshooting of prices upwards in 2007 and the first half of 2008. Agricultural markets and prices will be affected on both the demand- and supply-sides, not only through reduction in economic growth rates and demand but also through exchange rate changes, changes in the availability and cost of credit and changes in the availability of other external funding, including aid. However, the reduction in global economic growth will be the major influence on agricultural commodity markets and developing country agricultural prospects in the near future.

The impacts on demand for commodities will obviously be negative. Experience of previous recessions suggests that demand for, and prices of, raw materials such as natural rubber and fibres will be hardest and fastest hit, followed by livestock products for which income elasticities are relatively higher. The impact on basic food such as cereals and rice may be less, as consumption levels are defended and demand is maintained. Developing countries dependent on exports of raw materials and tropical products will face balance of payments problems in the absence of a similar or stronger decrease in the cost of food imports on which many also depend. The prevailing uncertainty and consequent negative market expectations are likely to further dampen demand overall. Hopes that commodity demand and prices might be sustained by continuing high growth rates in China and India and other rapidly growing economies in the developing world now look less tenable as their projected growth has been revised downwards. Availability of credit and liquidity is constraining agricultural trade, adding to the downward pressure on international prices but also reducing trade volumes. Falling oil prices will compound downward pressure on prices for commodities usable as feedstocks in biofuel production, although the net effect will depend upon their price movements relative to oil and the extent of biofuel policy support.

Lower prices in general are good news for consumers but will affect incentives for producers to make the investments needed to achieve greater food security in the medium and long term. With incentives for producers reduced some cutback in production might be expected, also reducing scope for rebuilding grain stocks. Whether falling prices are really good news for consumers depends on what happens to incomes, which will fall along with employment in the event of worldwide recession. Many developing countries are also highly dependent on remittances, so downturns in the developed economies could have an indirect impact on domestic demand in developing countries as employment and incomes of migrant workers fall. Remittances also provide funds for investment, including in agriculture.

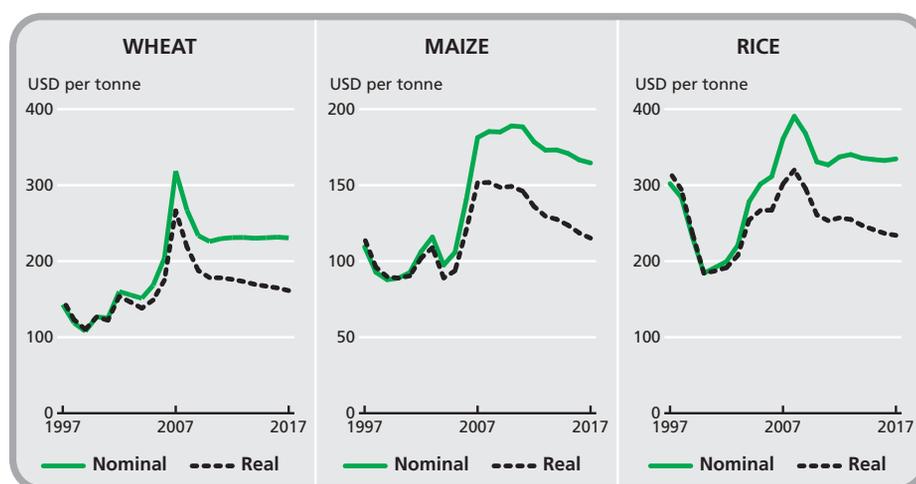
THE IMPACTS OF HIGH FOOD PRICES

THE IMPACTS OF RISING FOOD PRICES ON CONSUMERS⁶

The impact of high food prices is obviously most severe for the poor who rely on purchased food. For the poor in developing countries food can account for at least 50 percent and up to 70-80 percent of their budget so higher prices affect not only their food consumption in terms of quantity and quality, but also their spending in general. The most visible indicator of this negative impact was the social unrest and rioting that erupted around the world triggered by soaring food prices. Disturbances were mostly concentrated in urban areas where dependency on imported food and exposure to international food prices is probably highest and consumers felt the brunt of the impact of soaring food prices. However, the rural poor are also affected, even though their connections to international food markets might be weaker. The impact of higher food prices on the poor depends crucially upon whether they are net food-sellers, in which case the impact could in principle be positive, or net food-buyers in which case the impact is unequivocally negative. The evidence suggests that most households in the developing world and especially the poor are net buyers of food and this holds even for rural households which are mostly in agriculture. Whether urban or rural, it is the poorest of the poor who spend the biggest share of their income on food and who have no access to assets such as land who suffer most. Female-headed households figure disproportionately on both counts, so the negative impacts of high food prices also have a gender dimension which needs to be addressed in policy responses.

Faced with sharply rising food prices, poor households had to adjust their food consumption patterns. Households are reported to have reduced their food intake or to have attempted to maintain it by reducing their spending on more expensive foods and other non-food items. Among the poorest population groups, per capita cereal consumption may even rise in spite of increasing prices, as consumers shift to a cereals-based diet away from more expensive and higher quality food groups, including meat,

Medium-term projections of selected commodity prices



Source: FAO-OECD Agricultural Outlook

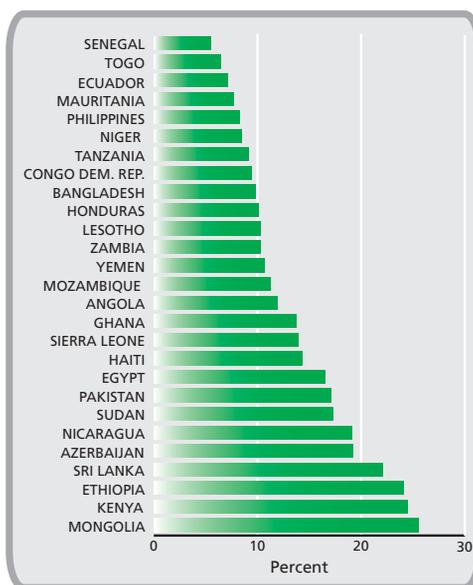
⁶ See *FAO State of Food Insecurity in the World 2008* for a detailed discussion of these impacts.

dairy products and vegetables. In spite of the soaring prices in global commodity markets, in particular of tradable staples such as wheat, rice and maize, the most recent data on the food use of these key commodities illustrate the resilience of per capita consumption. This trend is the same for most low-income countries, including those with high levels of under-nourishment. However, there are also instances of consumers returning to more traditional foods as the costs of preferred but imported cereals increased.

RISING FOOD PRICES FUEL INFLATION

Rising food prices contribute to the overall rate of inflation in most countries, including developed countries. Changes in food prices are an important component of the general rate of inflation, as measured by the consumer price index (CPI). This is a weighted average of the changes in the prices of a representative, fixed basket of goods, including food, and with the weights reflecting the importance of each good in the typical household budget. The greater the share of food in the household budget, the more rising food prices fuel general inflation. For most developed countries, food expenditure shares range between 10 and 20 percent.

Selected annual consumer price indices as of September 2008



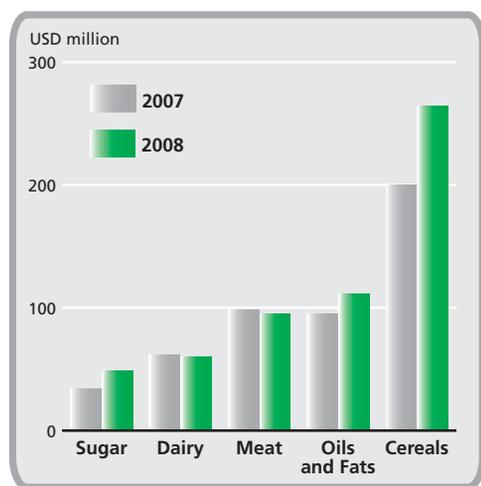
In developing countries the share of food expenditure in household budgets is much higher, absorbing more than half of family income in countries such as Kenya, Haiti, Malawi and Bangladesh.

In addition to imposing a heavy burden on the cost of living, rising food prices can have further indirect effects on inflation if they prompt pay increases – higher wage demands have been at the core of several protests. An inflation-targeting central bank might have to curb inflationary pressure from higher food prices when the effect on non-food prices is significant, and this would mean raising interest rates. This has become a growing tendency in developing countries, but higher interest rates would undermine the much needed investment in sectors which provide a path out of poverty for vulnerable countries, especially the agricultural sector.

HIGHER FOOD PRICES MEAN HIGHER FOOD IMPORT BILLS

In spite of the recent falls in international food prices, the global cost of imported basic foodstuffs in 2008 is forecast to reach more than USD 1 trillion, nearly 25 percent higher than in 2007, driven by substantially increased prices of rice, wheat, coarse grains and vegetable oils and compounded by increased freight costs which nearly doubled for many routes. Many of the poorest countries are food importers, heavily dependent upon cereal imports. Higher food prices on world markets mean higher food import bills and a balance of payments problem. The total cost of food imports for developing countries was already 33 percent higher in 2007 than in 2006, and annual food import bills for low-income food-deficit countries (LIFDCs) are now more than double their 2000 level.

Food import bills in 2007 and 2008

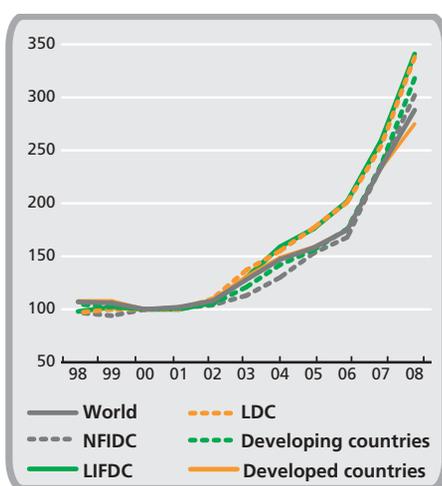


At national level, the impact of high commodity prices depends among other things upon whether a country is an importer or an exporter, what it imports or exports, its trade policy and its exchange rate policy. Low-income food-deficit countries dependent on increasingly costly cereal imports (in some cases for up to 80 percent of dietary energy supplies) and upon exports of tropical products or agricultural raw materials, for which prices increased less, and with currencies linked to or depreciating against the dollar are obviously the most vulnerable. The situation of countries that in addition are food insecure (in the sense of more than 30 percent of the population being under-nourished) and net fuel importers

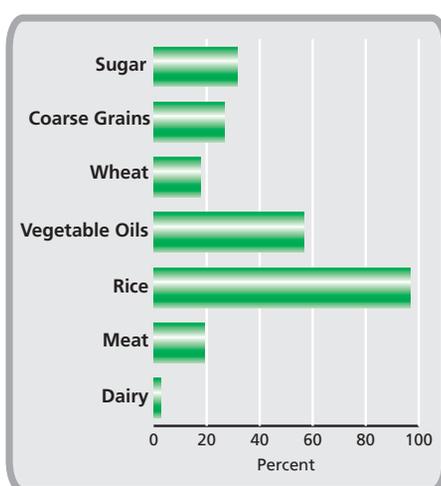
is obviously extremely precarious. There are more than twenty developing countries with these characteristics with at least 16 of them in Africa.

It is apparent that the most vulnerable countries bear the highest burden of the increasing cost of imported food, with total expenditures by LIFDCs some 35 percent higher in 2008 than in 2007 – the largest annual increase on record. Compared to other developing countries, LIFDCs already tend to have on average significantly greater current account deficits as a percentage of their GDPs, spend a much greater share of the value of their merchandise exports to import food and have lower income per head⁷. The majority of LIFDCs have witnessed a decline in the value of their currencies against the dollar which

Food import bills of developed and developing countries (1998-2000=100)

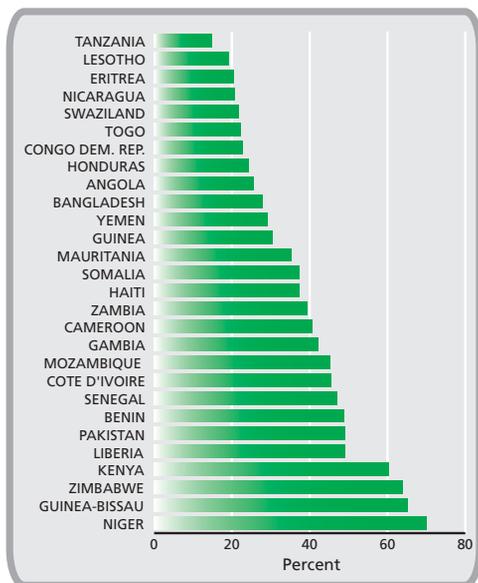


Forecast changes in global food import bills by type (2008 over 2007)



⁷ LIFDCs on average have significantly lower GDP per capita, USD 2,213, when compared to other developing countries, USD 7,453 (averages calculated over the period 2000-2004)

Forecast changes in food import bills of selected LIFDCs (2008 over 2007)



has further increased the cost of their food imports. These countries find themselves under economic pressure from all sides.

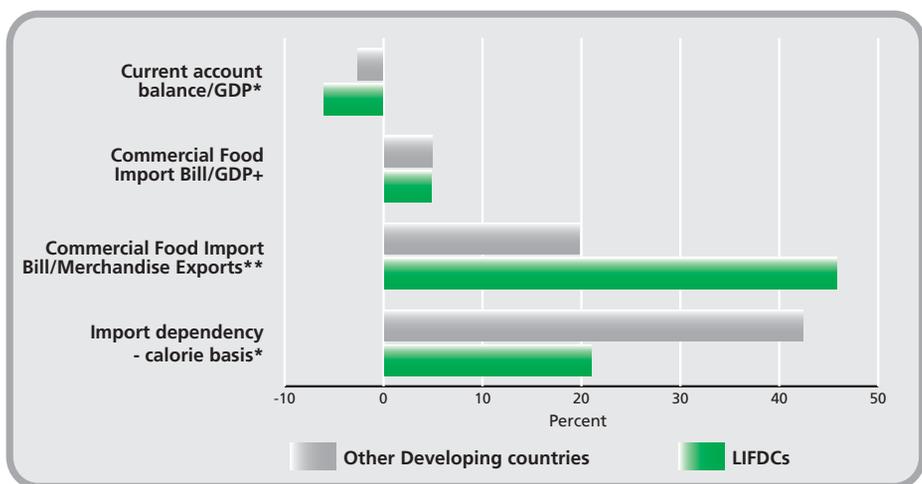
In addition, the financial crisis could have serious implications for food security in many developing countries. The tight credit situation may restrict access by poor countries to finance, thus limiting their ability to import food. LIFDCs in particular can have difficulty financing their cereal import needs through debt and may face increased fiscal pressure.

CONSUMERS LOSE BUT DO PRODUCERS GAIN?

Clearly, the impact of high food prices on consumers is unequivocally negative. But, after years of lamenting low world

prices for agricultural commodities, high prices should in principle have been good news for farmers around the world. Higher food prices stand to improve the incentives for those producing the particular products concerned. In principle, higher food prices increase the funds available to producers for investment, leading to increased agricultural growth and poverty reduction. In that sense, higher food prices might be considered an opportunity – at least for windfall gains for some. Access to means of production and assets like land is a critical factor in determining who reaps the benefits of higher food prices. Large landholders will benefit most. Households highly specialized in agriculture are also likely

Vulnerability of LIFDCs according to risk factors



Differences in group means are:
 * significant at 5% level
 ** significant at 10% level
 + not statistically significant

winners although these constitute a rather small proportion of the population, relative to the rest. But will producers respond by increasing supply? It appears that the high food prices have not been an opportunity for most developing country farmers and a supply response has not materialised. As noted earlier, in spite of enormous increases in prices, developing countries increased their cereal production by less than one percent in 2008 and in the vast majority of them production actually decreased. The hoped-for supply response simply failed to materialise. Understanding the reasons for that and hence what needs to be done to promote supply response are crucial strategic and policy issues. These are addressed in detail in the next part of this report.

PART 2:
WHY WERE HIGH FOOD PRICES
NOT AN OPPORTUNITY FOR
POOR FARMERS?

Producers in developing countries have faced real decline in prices in most of the last fifty years. The result has been lack of investment in agriculture and stagnant production which were the background to the recent problems in international food system and which made it more difficult for developing countries to deal with. So, the high food prices and the possibility that they might persist, even if not at the peak levels reached in early 2008, on the face of it looked like an opportunity for small poor producers. But was it? Would producers invest and increase productivity and production in response and generate agricultural growth? Most developing country producers are far distanced from what happens on international markets, so increasing food prices there do not necessarily mean higher prices for poor producers. For this to be the case, those high international prices need to be transmitted across national borders and through marketing chains. But higher prices alone are still not sufficient. Incentives to invest and produce depend on how much costs of inputs such as seeds and fertilizers have risen as well as prices of outputs. Producers need to have access to affordable inputs. They also need to have access to affordable credit. Even where adequate incentives are in place, a positive supply response from producers can be blocked by a range of supply-side constraints, especially lack of transport and market infrastructure to get any increase in production to market. In many developing countries, none of these conditions are adequately met. As a result higher prices on international markets have not triggered a positive supply response by smallholder farmers in developing countries.

DO WORLD PRICE INCREASES REACH DEVELOPING COUNTRY PRODUCERS?

Food prices increased sharply in many countries in line with the international price boom. In others, domestic food prices did not follow the increase in world prices or were slow to adjust. Unless higher prices actually reach agricultural producers in developing countries, those producers will not benefit from increasing prices on world markets and will have no incentive to increase productivity and production. There are two questions to consider: first, do international price changes lead to price changes at national level; and secondly, if national prices do change, do they filter through to producers?

In theory, prices in a country which is linked to the world market in a free trade environment will move together with international prices expressed in the same common currency. If the national price is above the international price, imports will take place until the national price becomes equal to the international price after allowing for any transport costs. Increased exports fulfil the same equilibrating role if the national price is below the international price. Under these conditions, "price transmission" is complete: the price of a commodity sold on competitive world and national markets can only differ by the cost of transporting it. Commodity analysts view fast and complete price transmission as an indication of the efficient functioning of a market. However, in practice a number of factors can limit the extent to which world price changes "pass-through" to the national level⁸.

Policies at the border affect the extent to which world price changes pass-through to national markets. For example, export restrictions, or taxes hinder the transmission of price signals. *Ad valorem* import tariffs, unless they are prohibitively high, allow world price changes to be fully transmitted to domestic markets in relative terms. Therefore, an increase

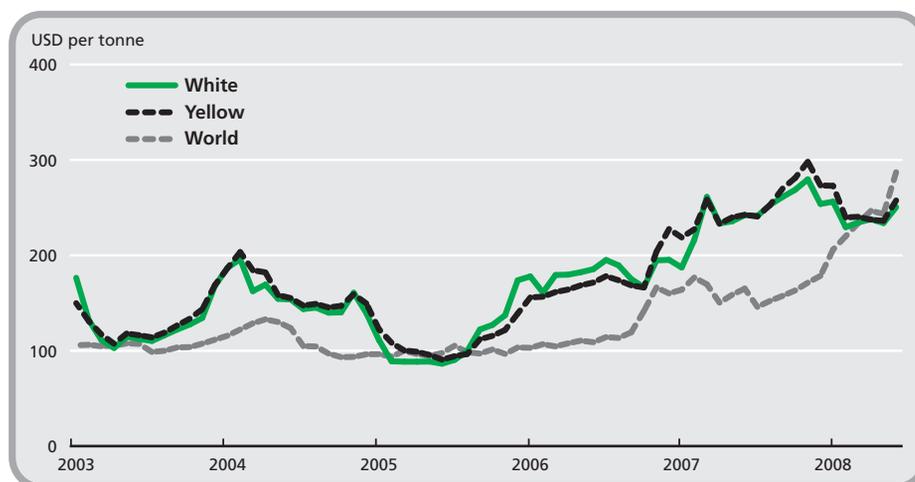
⁸ Rapsomanikis, Hallam and Conforti (2004) provides a comprehensive review of issues surrounding price transmission

in the international price will result in a proportional increase in the domestic price, at all points in time provided that tariff levels remain unchanged. Domestic markets can also be insulated by large marketing margins that arise due to high transport costs. Especially in developing countries, poor infrastructure, transport and communication services give rise to large marketing margins due to high costs of delivering the locally produced commodity to the border for export, or the imported commodity to the domestic market. High transport costs and marketing margins hinder the transmission of price signals, as they may prohibit arbitrage. Other factors, such as consumer preferences for specific attributes of locally produced food or quality differences between domestic and internationally traded commodities determine the extent to which domestically produced food can be substituted by food purchased in the world market and thus affect price transmission. The distinction between short run and long run price transmission is also important. Changes in the price in one market may need some time to be transmitted to other markets for a number of reasons such as policy interventions, adjustment costs, complexity of the marketing chain, contractual arrangements between economic agents, storage and inventory holding or delays in transportation or processing or even simple inertia. As a result, price transmission is rarely complete or rapid.

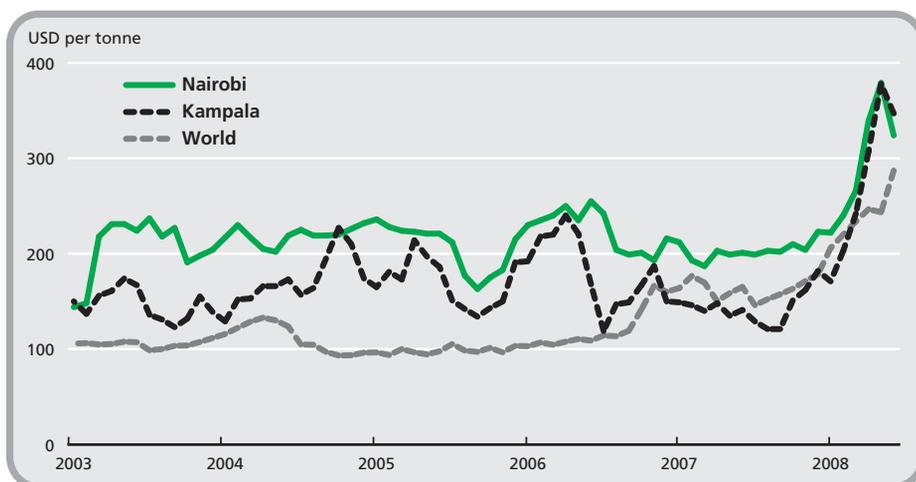
In the case of maize in Africa, transport costs, a weakening US dollar and consumer preferences hindered the transmission of price signals from the world market and domestic prices responded slowly. White maize is not readily substituted in consumption with internationally traded yellow maize. Nevertheless, increases in the volumes of maize traded, both formally and informally, across the Eastern and Southern African regions, mean that national markets are integrated with one another. Statistical analysis utilizing monthly maize price data for 1998-2008 suggests that both yellow and white maize prices in South Africa, the leading maize exporter in the region, respond slowly to changes in the world market price, but that world market price signals do pass-through across countries in the region. Between June 2006 and June 2008, the average monthly rate of increase of the world market price for yellow maize amounted to 3.9 percent, compared to white and yellow maize average increases of 1.2 and 1.6 percent per month respectively on domestic markets.

Maize prices in important markets in Eastern African countries such in Kenya and Uganda also move together with the world price. On average during 2003-2008, world

South Africa maize prices



Eastern Africa maize prices

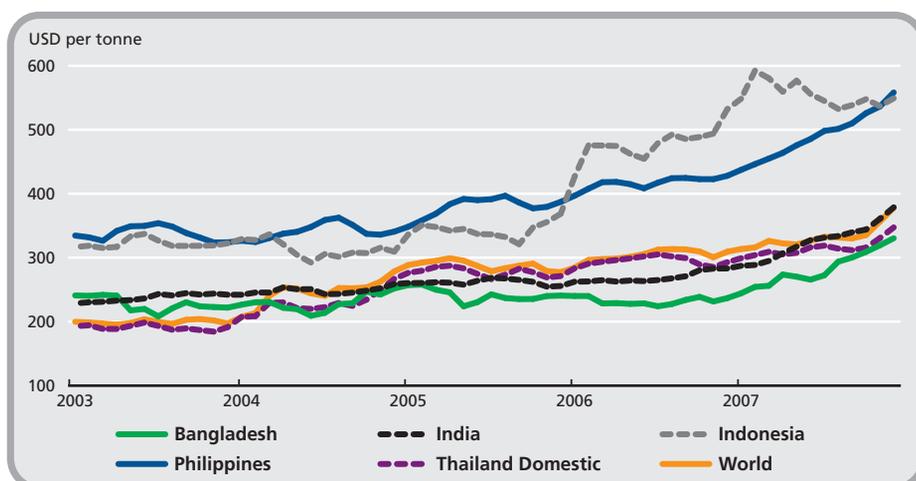


price changes filtered across these markets relatively slowly, with maize prices in Kenya and Uganda adjusting fully to world price changes after about 7 months. Nevertheless, the big increase in the world price of maize from July 2007 onwards is reflected in both countries, suggesting that adjustment to world market price changes can be fast, especially when such changes occur simultaneously with low stocks, or shocks in regional food supply or demand. During this period, the average monthly rate of growth of maize prices in Nairobi and Kampala amounted to 3.7 and 7.1 percent respectively, as compared to a world price monthly rate of 4.3 percent.

In the case of rice in Asia, the impact of world market price changes has varied from country to country, again depending upon exchange rates against the dollar, trade and market policies and the domestic demand and supply situation.

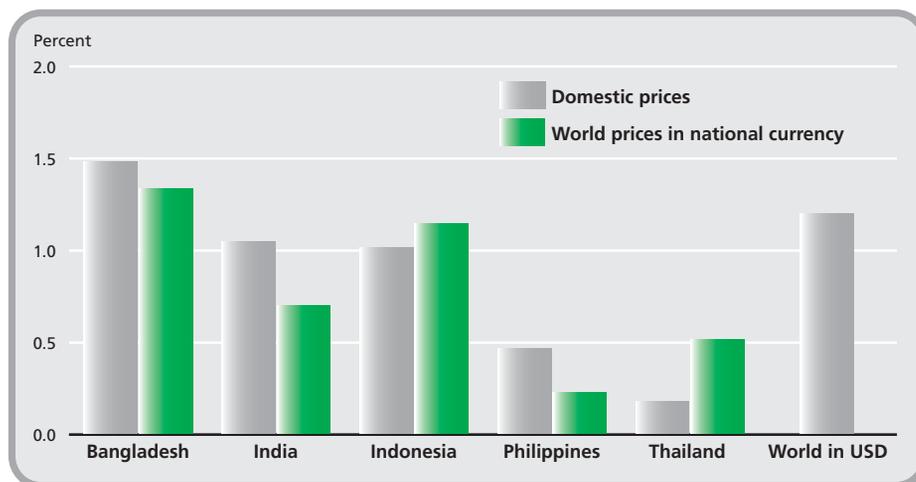
On average, the weakening of the USD during 2006-07 partly offset world price increases for a number of Asian countries. For example, in India, the Philippines and Thailand, the

Rice prices in selected countries



appreciation of the national currencies vis-à-vis the US dollar blunted world price increases at the border resulting in different patterns of domestic price behaviour, mainly due to national market fundamentals and, in some cases, policy response to the international rice price boom. In India, a major exporter of rice, domestic prices increased at a moderate rate due to increased production in the marketing season 2007-08 in conjunction with policy measures, implemented in the last quarter of 2007 that effectively banned most rice exports. In net importing countries, the larger part of the increase in domestic prices took place in 2007 and in most cases coincided with increased rice imports. In the case of Bangladesh, food shortages due to a cyclone and floods in 2007 contributed to significant increases in the domestic price of rice, while in Indonesia and Philippines, rice imports increased in order to meet the increasing demand for food.

Average monthly changes in domestic and world rice prices, 2006-2007



Even if there is transmission of international price changes to national level, this does not necessarily mean that price increases will reach all producers or consumers, although consumers in urban areas may be more quickly exposed to price increases. How much producers are affected depends on the extent to which they participate in local markets and the extent to which local markets are linked with broader national, regional, or international markets. It cannot be assumed that there is strong spatial price transmission and significant smallholder market participation in well integrated markets. In many developing countries these assumptions simply do not hold.

Smallholders are generally engaged in a different value chain from more commercial farmers who may be linked to large grain trading, processing, and retailing firms, commodity exchanges, networks of integrated silos, millers, and supermarket retailers, sometimes with transnational firm ownership, accessible market information, large transaction volumes, well-specified grades and standards, and legal systems that accommodate more sophisticated contracting arrangements. This contrasts with more informal chains in which smallholders are typically involved and which are characterized by spot market transactions, small percentages of production sold off the farm, weak road and communications infrastructure, weak information systems and limited coordination between input delivery, credit and sales.

There is a lot of evidence that smallholders in East and Southern Africa are only entering local level markets as sellers of grain to a rather limited extent. Throughout the region, the

FAO case study evidence on levels of smallholder market participation

Common to all the countries studied is the significant heterogeneity of household status with respect to maize production and sales.

In Kenya the proportion of maize sold is relatively high at 46 percent of total production. However, whilst 98 percent of households cultivate maize, only 36 percent sell the product, with 20 percent of households accounting for the majority of sales

In Zambia, about 80 percent of farm households grow maize, but less than 30 percent sell the product. Of the total sales, 40 to 45 percent were from 5 percent of farm households in the smallholder sector. These households tend to have incomes that are significantly higher (8-9 times) and are located in areas more accessible to markets than those households that do not sell.

In Mozambique, production and sales are also highly concentrated. Ninety percent of households in the central region produce maize but only 24 percent sell it. In the Southern region, 59 percent produce, but only 4 percent sell maize, and the average amount sold is only 150kg per household per year. Five percent of households account for 80 percent of sales nationally.

In South Africa, 18,000 commercial farmers account for 90 percent of grain production, with the remaining 10 percent accounted for by 3 million smallholders.

The differentiation across households is likely to become more distinct as average landholding sizes continue to fall. In Malawi, smallholdings have been reduced in size from an average of 1ha to less than 0.7 ha over the past 30 years. In an "average" year, only 20 percent of maize production is marketed.

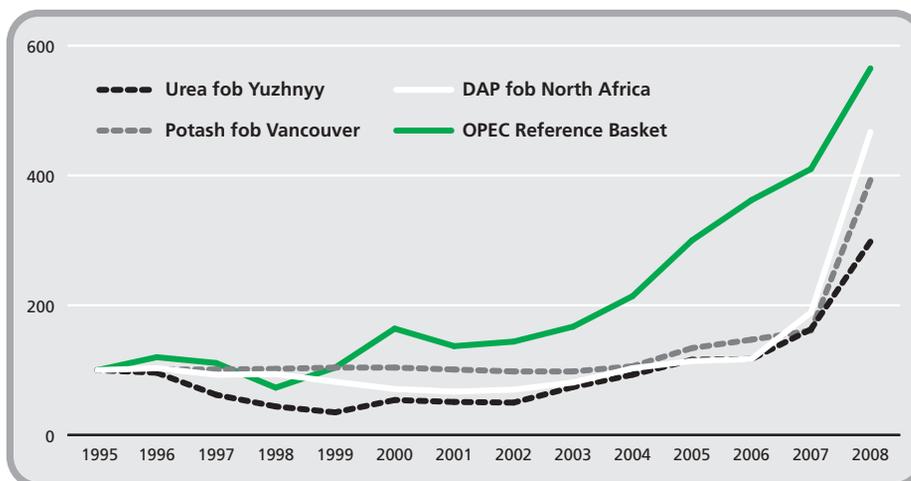
proportion of maize producers who are actively selling maize into local markets is low and often there is a greater level of participation of producing households as *purchasers* than as *sellers* of maize.

Given the limited market participation by smallholders, it follows that price increases may not have much effect on production incentives for many rural households who are not participating in markets to any significant extent as sellers. Compounding this is the fact that many producers are effectively isolated from regional or international markets as a result of weakly integrated markets. In such cases, price increases at those market levels will have no effect on the situation of smallholders. Econometric studies of market integration and price transmission in Africa tend to confirm this view.

PRICES INCREASED BUT SO DID COSTS

Whatever improvement higher product prices might have made to the incomes of producers, increases in input costs have worked against it or even cancelled it out. Input costs have been increasing steadily for some years and many farmers saw rising output prices as a temporary respite from diminishing margins over costs until input prices shot up dramatically in 2007, outrunning output prices.

Indices of crude oil and fertilizer prices, 1995=100



Source: International Fertilizer Association; OPEC (www.opec.org/home/basket.aspx)

Changes in output and input prices for selected products and inputs

	Meat	Dairy	Cereals	Oils	Sugar		Food price index ¹
(Jan-Apr)	%	%	%	%	%		%
2008-07	9	49	80	94	23		52
2007-06	5	35	32	29	-39		12
	Ammonia	Urea	CAN	NPK	DAP	IRAC Crude Oil ²	Input price index
(Jan-Apr)	%	%	%	%	%	%	%
2008-07	82	31	85	213	163	70	99
2007-06	4	29	15	41	33	-3	19

¹ Food price index: butter, cocoa, beans, corn, cottonseed oil, hogs, lard, steers, sugar and wheat. Input price index: Ammonia, Urea, CAN, NPK, DAP and IRAC Crude Oil

² Imported Refiner Acquisition Cost (IRAC) of Crude Oil in USA.

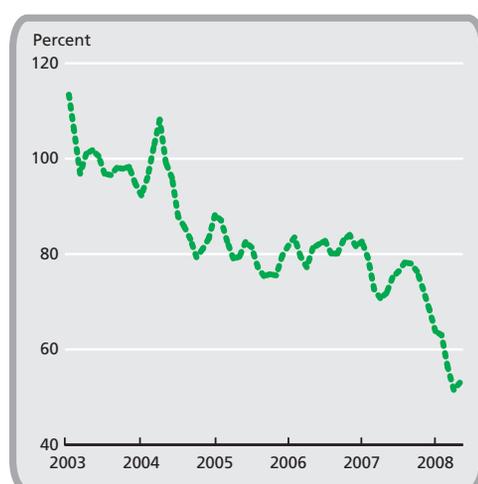
Sources: For food items: FAO-EST for meat, dairy, cereals, oils and sugar composites, and FAO-EST and Commodity Research Bureau for the food price composite index. For input items: FAO-AGP, Yara and Energy Information Administration.

The dramatic increase in oil prices beginning in 2003 has had a profound effect on all economic sectors including agriculture. Increases in fuel prices have raised the costs of producing agricultural commodities both directly by raising the cost of farm power and transport, but also indirectly since oil is an important cost item in fertilizer production. The increase in energy prices has been both rapid and steep, with the Reuters-CRB energy price index more than tripling since 2003.

The US dollar prices of some fertilizers (e.g. triple superphosphate and muriate of potash) increased by more than 160 percent in the first few months of 2008, compared to the same period in 2007. This rate of increase in the price of fertilizer was greater than the rate of increase in prices for agricultural products.

The output to input price ratio provides a broad indication of how farm profitability is changing. The steady increase in input prices over the last decade led to a declining trend in the output to input price ratio. Increasing productivity can offset the negative income

Output to input price ratio - food vs. inputs (2003=100)



Note: Output and input price indices are un-weighted geometric means of the relative nominal prices of the individual commodity prices. The relative price of each commodity is the nominal price over the base period price.

Sources: For food items: FAO and Commodity Research Bureau. For input items: FAO, Yara and Energy Information Administration.

consequences of a declining ratio, but this did not happen in most developing country agriculture, especially in Africa. The ratio deteriorated sharply with the sudden major increase in fertilizer prices in 2007. Furthermore, there is some evidence that while output price increases are not completely and rapidly transmitted to producers, increases in the prices of inputs, especially where these are imported, are passed on fully and quickly.

SUPPLY-SIDE CONSTRAINTS

If price incentives do materialize, the lack of integration into markets of many small producers prevents them from responding. The structure of smallholder agriculture in many developing countries

has a significant impact in constraining supply response and it is changing – land-labour ratios are declining as population increases - in a way that could further lower smallholder producers' capacity to respond to higher prices. Evidence from East and Southern-Africa shows that there is a high concentration of marketed maize among a small number of households (in some countries, two percent of households supply fifty percent of the total volume of marketed maize) and other smallholders are not making the investments needed to generate surpluses for sale on even moderately sized 3 to 4 hectare holdings. In Uganda smallholder agricultural production dominates, with farmers with an average land holding of less than 2 hectares producing more than 90 percent of total food production. Smallholder farmers account for about 80 percent of agricultural production in Ghana.

Throughout Africa, smallholder agriculture is often characterized by low productivity, rudimentary technology, minimal use of inputs including fertilizers, problems with marketing systems, and high crop losses. Agricultural yields have remained relatively unchanged, with much farming conducted by the aged with little or no knowledge of modern farming practices. The incentives for investment in terms of adequate and stable levels of profitability have been lacking, but there are also significant constraints to the adoption of improved technologies, such as shortage of locally improved seeds, planting materials and other inputs. Although in some countries access to inputs has improved with reforms with more licensed dealers and smaller quantities available for purchase, input use by smallholders remains low and constrains productivity.

The small quantities of products available to sell and a frequent lack of organization amongst smallholders to bulk these together into more economic volumes, together with the high cost of marketing due to weak infrastructure and communications, means it is not surprising that supply response to better prices is weak. Yet without that supply response, funds are not generated for investment. Throughout the production and marketing chain, a lack of access to affordable credit further limits the feasibility of productivity-improving

investments. These constraints need to be overcome to allow a significant supply response, and policy interventions are needed to break out of this vicious circle which traps small producers in poverty.

Development of physical infrastructure appears to be of particular importance in most developing countries. Well-developed transport, communication, storage and marketing infrastructure can facilitate the selling of output and the buying of inputs. Numerous FAO case studies from all over the developing world show that deficiencies in transport infrastructure are a major constraint, limiting access to domestic, regional and international markets.

Credit markets facilitate production, consumption smoothing, and the development of new enterprises. They are an important mechanism to assist the poor in adjusting to a new economic environment. Limited access to financial services (both credit and savings) has exacerbated vulnerability to shocks. However, most Structural Adjustment Programmes have reduced the availability of credit to rural households and raised its cost.

FAO studies report widespread difficulties for farmers in accessing credit. Small-scale farmers in Cameroon have little access to credit. Micro finance institutions were set up in 1992, but they remain poorly distributed throughout the country and sometimes lack good managerial practices. Smallholder farmers in Malawi face credit constraints, with micro finance institutions tending to emphasize finance for off-farm business activities, and much of the available agricultural credit is confined to the tobacco sector. Small- and medium-scale traders in Tanzania cannot access the credit that would enable them to purchase stocks of produce and sell out of season at higher prices. Some farmers shifted away from the production of cash crops such as cotton because food crops can more easily be sold on cash terms. In Uganda, the only source of credit for rural dwellers is the micro finance industry, which favours non-agricultural activities. Attempts are currently underway in Uganda to develop financial services that meet the needs of the rural population and integrate them into the national financial system. In Guatemala, agricultural credit availability is low and declining. Most available credit is channelled towards export products (traditional and non-traditional) with little support for basic grains production. Guyana attempted to overcome the problems in obtaining acceptable forms of collateral security faced by many small farmers. The Institute of Private Enterprise Development Limited (IPED) was established in 1986 as a local NGO to provide loans to small entrepreneurs. It uses a cross guarantee system, whereby each member of a small group is liable for the debts of the others. IPED has been instrumental in facilitating output increases for a number of small producers. On the other hand, the experience with government credit provision schemes in Peru was not positive, with massive losses in capital reported. Most of the credit to the agricultural sector now comes from commercial banks and there was a dramatic reduction in the number of small farmers supported by the formal financial system during the 1990s.

CAN DEVELOPING COUNTRY FARMERS RESPOND TO HIGH FOOD PRICES?

It is claimed that the recent high food prices present an opportunity for the agricultural sector in developing countries to increase production and raise incomes and re-establish itself as an engine of growth. Whilst there is some evidence that output responds positively to real price increases and negatively to decreases, this is not always found to be the case. A wealth of FAO case study evidence shows that price increases alone are not enough to increase

productivity and supply. In a review of 150 episodes of price and production changes in the recent past, FAO found that in only 66 percent of cases was the response in the direction expected, with 34 percent of cases either reporting an increase in production when prices were falling, or a decrease in production when prices were increasing. Overall, the picture is mixed regarding how developing country farmers are likely to react to high product prices.

What is clear is that higher output prices alone are not sufficient to encourage a significant expansion in food supplies. A significant supply response requires investment to increase smallholder productivity. Expanding production into new land will not be enough to meet future food needs. In order to match the global demand for affordably-priced food by 2050, annual food production must increase more than one percent annually, and an estimated 80 percent of the increase will have to come from growth in yields. Also, productivity-led increases in food and agricultural production will increase not only farm incomes, but will also stimulate backward and forward linkages in the rural economy and lead to a reduction in poverty.

Significant supply response based on productivity improvement requires a favourable and stable incentives environment in which higher commodity prices are transmitted to the farm level and producers have access to affordable inputs and can get their output to market. This call for addressing the various structural constraints that limit smallholder productivity – rudimentary technology, lack of access to modern inputs and credit, poor marketing and transport infrastructure and ineffective rural services and institutions. Effective government policies have a role in ensuring that these conditions are met. Successes in transforming agriculture in India, for example, were based on state support to credit, inputs and irrigation infrastructure, which the market had failed to provide. However, the wrong policy choices can block the transmission of higher prices to producers, stifle incentives and discourage supply response.